ADJUSTMENT SPEED TOWARDS TARGET CAPITAL STRUCTURE AND ITS DETERMINANTS IN PAKISTAN

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ABSTRACT

This study investigates the dynamism of the capital structure of the non-financial listed firms in Pakistan for the period from 2003 to 2012. Specifically, the main objectives of the study are to estimate the adjustment speed towards target capital structure, determining the factors affecting the adjustment speed towards target capital structure, and identifying the factors affecting the target capital structure. Firm specific and country specific factors are used to investigate the determinants of adjustment speed and target capital structure. Difference Generalized Method of Moments (GMM) is used as the estimation technique to avoid the endogeneity and serial correlation problems. The study confirms the existence of optimal capital structure for Pakistani non-financial listed firms, and concludes that firms make full adjustment towards optimal capital structure in 1.46 years to 2.03 years, depending upon the proxy of target debt used. Similarly, factors affecting adjustment speed towards target are also found to be dependent upon the proxy of debt used. Firms' profitability, stock market development, and distance are found to be relatively consistent determinants of the adjustment speed. Firm and country specific factors affecting target capital structure are also found to vary across the proxies of debt used. However, tangibility, earning volatility, cash, and industry median leverage appear consistently and significantly affecting the target leverage. Interest rate, the only country specific factor, is found to affect target debt when total liabilities to total assets and total debt to total assets are used as measure of the debt. This study contributes in the existing literature of the capital structure by providing evidence regarding the existence of target capital structure in Pakistan. In addition, this is the first attempt that estimates the adjustment speed towards target capital structure, and identifies factors affecting adjustment speed towards target capital structure for Pakistan using four different proxies of leverage.

Keywords: dynamic capital structure, speed of adjustment, generalized method of moments

ABSTRAK

Kajian ini menyiasat kedinamikan struktur modal syarikat-syarikat bukan kewangan yang disenaraikan di Pakistan dari 2003 hingga 2012. Secara khusus, objektif utama kajian ini ialah untuk menganggarkan penyesuaian halaju terhadap sasaran struktur modal, menentukan faktor-faktor yang mempengaruhi penyesuaian halaju terhadap sasaran struktur modal, dan menentukan faktor-faktor yang mempengaruhi sasaran struktur modal. Faktor spesifik syarikat dan faktor spesifik negara digunakan untuk menyiasat penentu penyesuaian halaju dan sasaran struktur modal. *Difference Generalized Method of Moments* (GMM) digunakan sebagai teknik anggaran bagi mengelak masalah endogeniti dan korelasi bersiri. Kajian ini menyokong kehadiran struktur modal optimal untuk syarikat-syarikat bukan kewangan yang disenaraikan di Pakistan, dan menyimpulkan bahawa syarikat membuat penyesuaian penuh terhadap struktur modal optimal dalam tempoh 1.46 tahun hingga 2.03 tahun, bergantung kepada proksi sasaran hutang yang digunakan. Faktor yang mempengaruhi penyesuaian halaju terhadap sasaran juga didapati bergantung kepada proksi hutang yang digunakan. Keuntungan syarikat, pembangunan pasaran saham, dan jarak didapati secara konsisten sebagai penentu penyesuaian halaju. Faktor spesifik syarikat dan faktor spesifik negara yang mempengaruhi sasaran struktur modal juga didapati berbeza bergantung kepada proksi hutang yang digunakan. Walau bagaimanapun, tangibiliti, volatiliti pendapatan, tunai, dan median leveraj industri dilihat konsisten dan signifikan dalam mempengaruhi sasaran leveraj. Kadar faedah yang merupakan satu-satunya faktor spesifik negara didapati mempengaruhi sasaran hutang apabila jumlah liabiliti kepada jumlah aset dan jumlah hutang kepada jumlah aset digunakan sebagai ukuran hutang. Kajian ini menyumbang kepada literatur sedia ada tentang struktur modal dengan menyediakan bukti tentang kewujudan sasaran struktur modal di Pakistan. Sebagai tambahan, ini merupakan cubaan pertama yang menganggarkan penyesuaian halaju terhadap sasaran struktur modal, dan mengenalpasti faktor-faktor yang mempengaruhi penyesuaian halaju terhadap sasaran struktur modal di Pakistan menggunakan empat proksi leveraj yang berbeza.

Kata kunci: struktur modal dinamik, penyesuaian halaju, *generalized method of moments*.

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LIST OF ABBREVIATIONS

ASEAN	Association of South East Asian Nations
CBA	Collective Bargaining Agency
CEE	Central and Eastern European
CEO	Chief Executive Officer
CPI	Corruption Perception Index
CV	Coefficient of Variation
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest Taxes Depreciation and Amortization
FMOLS	Fully Modified Ordinary Least Square
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HLM	Hierarchical Linear Modeling
IFS	International Financial Statistics
ISE	Islamabad Stock Exchange
KSE	Karachi Stock Exchange
LSE	Lahore Stock Exchange
LTD	Long Term Debt
MM	Modigliani-Miller
MTB	Market-to-Book
NDTS	Non Debt Tax Shield
NPV	Net Present Value
OD	Observed Debt
OLS	Ordinary Least Square
R&D	Research and Development
ROA	Return on Assets
ROE	Return on Equity
SBP	State Bank of Pakistan
SEM	Structural Equation Modeling
SMEs	Small and Medium Enterprises
STD	Short Term Debt
TA	Total Assets

TD	Target Debt
TFCs	Term Finance Certificates
TSLS	Two Stage Least Square
UK	United Kingdom
US	United States
WACC	Weighted Average Cost of Capital
WDI	World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background and Motivation of the Study

The debate on the issue of optimal capital structure[1] began after the founding research study by Modigliani and Miller (1958). In this paper they conclude that under the restrictive set of assumptions the capital structure is irrelevant. That means financing with debt or equity doesn't affect the firm's value (Modigliani & Miller, 1958). After 5 years of this irrelevance theory, Modigliani and Miller (1963) considered the corporate taxes and favored the use of 100 percent debt in capital structure due to tax deductibility of interest expense. Kraus and Litzenberger (1973) further advanced the Modigliani and Miller's work and considered both the benefits of using debt and the bankruptcy costs that could incur due to use of the excessive debt, and suggested an optimal capital structure.

Since then numerous research studies, mainly focusing on developed countries, have been conducted investigating the factors determining the optimal capital structure, and many theories have emerged from these studies. Worth mentioning theories are: Trade-off theory, Dynamic trade-off theory, Agency theory, Market Timing theory, and Pecking order theory. The applicability of the theories of capital structure, formulated on the basis of empirical evidences from developed countries, need to be investigated and understood

[1] The term optimal capital structure is also referred as the target capital structure, optimal leverage, target leverage, target debt, and optimal debt. These terms have been used interchangeably in this document.

in context of developing countries that are having different legal, economic, and institutional environments (Deesomsak, Paudyal, & Pescetto, 2004).

The studies conducted so far to understand the corporate financing behavior, focus on factors determining the organizational debt. These studies consider the three types of capital structure determinants: firm specific factors, industry specific, and country-specific. Even though firm related factors are supposed to be the important factors influencing capital structure decisions; but the empirical results are mixed and sometimes difficult to infer. Initial empirical studies focused on the firm and industry specific factors influencing leverage decisions. Thereafter the focus shifted from only firm specific to both firm and country specific factors to understand the cross country difference in capital structure determinants. Widely cited cross country study on the issue of the capital structure determinants is of the Rajan and Zingales (1995). In their study they conclude that the same firm specific factors affect capital structure in both US and G-7[2] Countries. Krishnan and Moyer (1997) report significant differences in capital structure on the basis of country, tax rate, and firms' size. Booth, Aivazian, Demirguc-Kunt, and Maksimovic, (2001) investigate the factors determining capital structure and report that the factors that determine the capital structure in developed countries also determine the capital structure (leverage) in developing countries; despite the differences in their institutional factors. Deesomsak *et al.* (2004) investigate the financial leverage decisions of the firms of the four countries including Malaysia, Singapore, Thailand, and Australia and report

[2] G-7 is a group of seven developed countries including USA, Canada, UK, Italy, France, Germany, and Japan.

significant differences in capital structure determinants. De Jong, Kabir, and Nguyen, (2008) examine the country specific and firm specific factors affecting corporate leverage in 42 countries and report differences in significance of the variables. They conclude country specific factors are important to consider in understanding the capital structure determinants.

Many other studies have been conducted that either only consider the firm specific variables or both firm and industry specific variables and some also consider country factors. Some of them are Fan, Titman, and Twite (2012), Dhaliwal, Heitzman, and Li (2006), Welch (2004), Frank and Goyal (2009), Hanousek and Shamshur (2011), Chui, Lloyd, and Kwok, (2002), Mustapha, Ismail, and Minai (2011), Mahmud, Herani, Rajar, and Farooqi (2009), Titman and Wessels (1988), Wiwattanakantang (1999), Harris and Raviv (1991), Chen and Chen (2011), Drobetz and Fix (2005), Krishnan and Moyers (1997), Kayo and Kimura (2011), Baker and Wurgler (2002), Graham and Harvey (2001), Myers and Majluf (1984), and Cashman, Harrison, and Seiler (2013).

All of these above mentioned studies use static framework to analyze the determinants which consider the observed leverage as the dependent variable and focus on its determinants. They implicitly assume the observed leverage ratios as the optimal leverage ratios. Jalilvand and Harris (1984) report that the financial behavior of the firms is characterized by the fractional adjustment towards long run target capital structure and firms strive to reach that target with certain adjustment speed. Drobetz and Wanzenried

(2006) argue that companies may not always be on their optimal or target debt levels rather may deviate from target due to random changes and shocks and try to converge back to target overtime.

Similarly, Flannery and Rangan (2006) conclude that the firms have a target capital structure and about one third of the gap between actual and target leverage is closed in one year. Huang and Ritter (2009) also report that firms converge to target debt ratio in 3.7 years. Hovakimian, Hovakimian, and Tehranian (2004) also find that firms tend to make financial choices that bring them closer to their target leverage ratio which itself may not be constant and change over time due to changes in factors such as profitability and firm's stock price. Drobetz and Wanzenried (2006) further argue that sometimes firms may not intentionally be moving to target leverage ratios due to adjustment costs. Frank and Shen (2013) also show that the firms move their equity and debt towards targets.

Based on these arguments and findings, a relatively new theory of capital structure named the dynamic trade-off theory has evolved, which describes that every firm has target debt ratio and due to the presence of market imperfections and adjustment costs the observed debt ratios and the target debt ratios are not the same always. Rather firms move towards target debt ratio with certain speed. The adjustment speed, in empirical studies, is reported to be dependent upon firm specific factors such as size, profitability, distance between target and observed leverage, and country specific factors such as interest rates,

stock market development, bond market development, GDP growth rate and others (Drobetz & Wanzenried, 2006; Clark, Francis, & Hasan, 2009; Mukherjee & Mahakud, 2010; Oztekin & Flannery, 2012; Haron *et al.*, 2013). If there are no costs of adjustment, companies can instantaneously adjust their capital structures towards their optimal debt ratios. Because of the adjustment cost firms adjust partially towards the optimal debt ratio (Mukherjee & Mahakud, 2010).

Having recognized the dynamism of capital structure, recent empirical studies of optimal leverage (capital structure) have started to use the dynamic models that consider both observed and target debt ratios separately due to existence of the cost of adjustment. Worth mentioning are the studies of Fama and French (2002), Fischer, Heinkel, and Zechner (1989), Ozkan (2001), Drobetz and Wanzenried (2006), Flannery and Rangan (2006), Mukherjee and Mahakud (2010), Huang and Ritter (2009), Cook and Tang (2010), Oztekin and Flannery (2012), and Haron *et al*. (2013). Some of these studies focus on factors determining the target capital structure, estimating adjustment speed towards target capital structure, and factors determining adjustment speed towards target capital structure. Limited work has been done to understand these aspects of dynamic capital structure in context of developing countries, including Pakistan. Hence this study investigates the factors determining the target capital structure, estimating the speed of adjustment towards target capital structure, and factors affecting the speed of adjustment towards target capital structure in Pakistan.

1.2 Problem Statement

The area of the capital structure in corporate finance is being extensively researched for last five decades. Despite the investigation of five decades, the speed of the work in this area has not decreased as 10 percent of the research articles published in three top tier journals of finance in last three years, relate to the question of capital structure (Denis, 2012). This reflects that the finance researchers consider this field important and interesting to be investigated as they find inconsistency in results regarding the factors affecting debt financing behavior of the companies and its dynamism in both developing and developed countries. Deesomsak *et al.* (2004) report mixed and inconsistent results regarding the determinants of optimal debt. Beattie *et al.* (2006) conclude that no theory alone explains the complexity of capital structure decisions. Al-Najjar and Taylor (2008), as cited in Haron (2014), also report the inconsistency of results in explaining the capital structure decisions.

There is dearth of the empirical studies considering dynamic aspects of capital structure and estimating the adjustment speed towards target and factors affecting the speed of adjustment. To the best of the researcher's knowledge the studies on the capital structure, taking in account exclusively Pakistan, are lacking. Some studies like Sekely and Collins (1988), De Jong *et al.* (2008), Mahmud *et al.* (2009), Booth *et al.* (2001), Kayo and Kimura (2011), Oztekin and Flannery (2012), and Ameer (2013) are there that consider the developing countries. The sample of these studies, besides other countries, also consider Pakistan on the issue of capital structure but these studies do not closely discuss

and analyze the leverage determinants, speed of adjustment, and factors influencing adjustment speed towards target debt ratios for Pakistan.

Booth *et al*. (2001) finds Pakistan as the country with very high total debt ratio of 65.2% and long term book debt ratio of 26%. De Jong *et al*. (2008) report the mean long term debt ratio for Pakistan to be 16.6% and De Jong *et al.* (2008) further show that amongst 42 countries, Pakistan is at the 9th number in using the high debt. Fan *et al.* (2012), in a sample of 50 countries, also find Pakistan among the top 5 countries having leverage ratio of over 40 percent. Mumtaz, Rauf, and Noreen (2013) also report that the large companies of Pakistan are over leveraged and they heavily rely on bank credit. They further report that these firms, together with domestic commerce, account for approximately two third of total domestic credit. Akhter (2007) reports that Pakistan's corporate bond market is underdeveloped and accounts for less than 1% of GDP. This also confirms the heavy reliance of corporate borrowing on banking sector.

Over use of debt in capital structure enhances the financing cost and probability of failure. Ijaz, Hunjra, Haneef, Maqbool and Azam (2013) report that the number of business failures in Pakistan is increasing, which requires immediate attention of the government. This is also evident from the growing number of companies recently delisted from Karachi Stock Exchange (KSE) and increase in non-performing loans of banks in Pakistan. Karachi Stock Exchange delisted 69 firms in 2012 which constitute

more than 10% of the total listed firms[3]. As per the list available on website of the KSE, 16 firms have been delisted in 2013. These companies have been delisted either on account of making default on various listing regulations of Karachi Stock Exchange or have been liquidated or in process of liquidation. Non-performing loans (bad debts) of the banking sector of Pakistan also are continuously increasing. They had reached to all time high of Rs 635 billion by the end of June 2012 (Ministry of Finance Pakistan, 2012-13)[4].

Newton (1985) and Her and Choe (1999), as cited in Abbas and Rashid (2011), report that one of the main reasons behind varying corporate failure rates in different countries is the difference in the capital structure of the businesses. Bankruptcy due to use of the high debt may be explained in context of trade-off theory of the capital structure (Matemilola, Bany-Ariffin, & McGowan, 2013). Given this and above facts it becomes important to understand the financing decisions of the firms by investigating the factors affecting the firms borrowing decisions in Pakistan. Further in line with the arguments and findings of the studies of Fischer *et al.* (1989), Drobetz and Wanzenried (2006), Getzmann, Lang, and Spremann (2010), and Haron *et al.* (2013), regarding the dynamism of capital structure, there is also need to identify factors determining the optimal capital structure, estimating the adjustment speed, and factors affecting the adjustment speed towards optimal debt ratios by using dynamic framework in Pakistan.

[3] Retrieved from http://ksestocks.com/OldCompanies/Delisted on December 16, 2013.
[4] Pakistan Economic Survey is the Annual publication of the Ministry of Finance, Government of Pakistan. Full publication is available at http://www.finance.gov.pk/survey_1213.html

The available empirical literature on the issue of capital structure particularly the dynamism of capital structure for Pakistani firms is not enough and comparable to the developed countries. There is a need to conduct the empirical study investigating the existence of optimal debt ratios, determinants of optimal capital structure, estimate speed of adjustment towards target leverage ratio, and the determinants of the speed of adjustment using partial adjustment model in Pakistan and find the possible explanation of the differences reported by Booth *et al.* (2001), Kayo and Kimura (2011), Oztekin and Flannery (2012), Getzmann *et al.* (2010), Ameer (2013), Clark *et al.* (2009), and De Jong *et al.* (2008) by using more and different country, firm, and industry specific variables and help financial managers of the firms in Pakistan to reassess the level of debts used. None of the studies has been found by the researcher that investigates solely for Pakistan the dynamics of capital structure including the determinants of optimal capital structure, estimating adjustment speed, and factors influencing adjustment speed towards optimal capital structure. The available studies in which Pakistan is also considered as one of the sample countries do not investigate the factors affecting the adjustment speed towards target capital structure in Pakistan and use limited set of variables.

Being motivated by the increasing number of bankruptcies in Pakistan and non existence of the optimal capital structure studies, this study investigates the dynamism aspect of capital structure with enhanced set of explanatory variables of optimal leverage and adjustment speed. The categories of variables affecting optimal debt and adjustment

speed towards optimal debt considered in this study are the firm specific variables, industry specific variables, and country specific variables.

Amongst the firm specific variables the most important and widely considered variable affecting optimal debt is the firms' profitability. Importance of profitability for capital structure decisions may be better understood in context of the pecking order theory of the capital structure. The higher the profitability the lower the need of external financing as firms can meet their capital requirements from retained earnings. The negative significance of the profitability in determining optimal capital structure is established in many studies (see for example, Rajan and Zingales 1995, Booth *et al*. 2001, Flannery and Rangan 2006, and Haron *et al.* 2013). The positive relationship of profitability with leverage which is in line with predictions of trade off theory is reported by Hovakimian *et al.* (2004). Given the contradictory findings (both positive and negative significance) of profitability established in empirical studies, it is worth investigating this factor in this study of capital structure for Pakistan.

Tangibility, another firm specific variable, shows the amount of fixed assets in total assets. Fixed assets can be used as the collateral by the firms to obtain secured loans and they are supposed to be more liquid than intangible assets in case of bankruptcy. Trade-off theory of the capital structure lends support to the importance of tangibility as it reduces the risk of lenders. The positive significance of the tangibility in capital structure

decisions is established in the studies of Heshmati (2001), Drobetz and Wanzenried (2006), and Haron *et al*. (2013). However, Mukherjee and Mahakud (2010) report the negative significant impact of tangibility on optimal debt. These conflicting evidences support further investigation of this variable in determining optimal debt.

Firm's growth is found to play role in leverage decisions. Baker and Wurgler's (2002) market timing theory of capital structure considers the growth potential as the important factor affecting debt levels. Negative significance of growth in capital structure decisions has been established in earlier studies (see for example, Frank and Goyal, 2004¸ Lopez-Gracia & Sogorb Mira, 2008; Mukherjee & Mahakud 2010; and Fan *et al.,* 2012). However some studies, such as Haron *et al*. (2013) and Cho, Ghoul, Guedhami, and Suh (2014) report the positive significant impact of growth on leverage. This variable, given inconsistencies in findings, requires to be further investigated in this study of the dynamic capital structure of Pakistan.

Business Risk, also a firm specific factor, reflects to the earning volatility of the firms. Unexpected change in earnings may make it difficult for the firms to meet the obligations of interest or payment of the maturing debt. Hence, trade-off theory of capital structure considers the business risk as an important factor affecting leverage. Heshmati (2001) and Drobetz and Fix (2005) indicate negative insignificant relationship, while De Jong *et al.* (2008) report negative significant relationship of business risk with leverage.

Antoniou, Guney, and Paudyal (2008) report positive relationship of business risk with optimal debt. Given this inconsistency it becomes important to study the impact of the business risk on borrowing decision for Pakistani firms.

The main advantage of using debt is the tax deductibility of interest payments. The higher the tax rate the higher will be the advantage of using debt. At the same time higher tax rate may also enhance the non-debt tax shield reducing the importance of using debt. Some of the empirical studies using this firm specific variable and finding different impact on leverage levels are Delcoure (2007), De Jong *et al.* (2008), Fan *et al*. (2012), and Saarani and Shahdan (2013). Inclusion of effective tax rate as explanatory variable in this study may possibly yield better insights regarding its role in target debt decisions for Pakistan.

Firm size may be an important factor influencing the leverage decisions. Size may be proxy for information to outsiders and also riskiness of the firm due to diversification. The empirical studies that find firm size as significantly influencing the capital structure decisions are Rajan and Zingales (1995), Bhaduri (2002), Gaud, Jani, Hoesli, and Bender (2005), Chen and Chen (2011), and Matemilola *et al.* (2013). Based on the prior research findings on the issue of capital structure, it would be worth including this variable in this study.

Cash flows, another firm related determinant of debt, is also considered in this study as the determinant of optimal debt. Agency theory lends support to the cash flows as determinant of the debt level. Ameer (2013) confirms the negative effect of free cash flows on target leverage ratio for Asian and South American firms. Regarding the cash, De Jong (2002), in a sub sample, concludes that firm having high free cash flows and low growth opportunities uses less leverage. De Jong and Vandijk (2007), in their study regarding the optimal leverage, conclude that the free cash flow may lead to the overinvestment problem. Given its possible effect and limited use in empirical studies, cash flow is considered for further investigation in this study.

Depreciation, a firm related factor, is an alternate to debt tax shield. High depreciation, a source of non-debt tax shield, may lead to lower levels of debt. Some studies investigating the depreciation as the determinant of leverage and reporting different results are Drobetz and Fix (2005), Flannery and Rangan (2006), Delcoure (2007), Viviani (2008), and Getzmann *et al*. (2010). The investigation of this variable in context of the Pakistan may yield better understanding of the role of non-debt tax shield in borrowing decisions.

As noted by Harris and Raviv (1991) the industrial classification is an important determinant of the leverage. Firms from different industries are not likely to have same debt. In order to capture the industry effect it is important to consider the industry median

leverage in this study. Some of the studies that report the significant impact of the industry variable are the Flannery and Rangan (2006), Frank and Goyal (2009), Mukherjee and Mahakud (2010), and Hanousek and Shamshur (2011). These studies use industry median leverage to capture the industry effects and indicate significant positive relationship between target debt ratio and industry median leverage.

This study is also aimed at determining the impact of country specific variables on capital structure decisions. Amongst them is the GDP growth rate that may reflect the level of economic activities in the country. This variable has been investigated in some of studies of capital structure due to its linkage with stock market performance, firms' profits, taxes and interest rates. Few studies of the capital structure considering this variable are De Jong *et al.* (2008), Mukherjee and Mahakud (2010), Kayo and Kimura (2011), and Haron *et al.* (2013). Haron and Ibrahim (2012) find the economic growth to be the significant factor affecting the target debt ratios.

Interest rate, another country specific factor, is the cost of debt capital and it is likely to have direct impact on corporate borrowing decisions. However its impact has not been widely investigated. Haron and Ibrahim (2012) and Hendersen, Jegadeesh and Weisbach (2006), report an inverse relationship between interest rate levels and amount of debt issued. Antoniou *et al.* (2008) report that if long term interest rate is high than the firms

avoid issuing the debt. Given its importance, it is worth considering interest rate as the independent variable in this study.

Similarly stock market development may have significant influence on capital structure decisions. Developed equity market may stimulate the firms to use equity. Market timing theory states that firms prefer equity over debt if stock market's performance increases. It has been used as the independent variable in some of the studies. Demirgüç-Kunt and Maksimovic (1996) concludes the negative relationship between the stock market development and the level of debt used in developed countries while Kayo and Kimura (2011) indicate the positive relationship for developed countries and negative relationship for developing countries. Stock market development reflect country's institutional environment.

This study also considers the five firm specific factors and three country specific factors as the determinants of the speed of adjustment towards target debt ratio. The firm specific factors used as the determinants of adjustment speed are growth, size, profitability, effective tax rate, and distance between observed leverage and target leverage. The country specific factors used as the determinants of adjustment speed are GDP, stock market development, and interest rate. The reasons to consider these variables in this study follows.

Growing firms need to raise capital frequently to finance the growth. They may use financing alternatives that help them move towards target debt ratio. While a no-growth or low growth firms cannot have such flexibility. Drobetz and Wanzenried (2006), Clark *et al.* (2009), and Mukherjee and Mahakud (2010), in their empirical studies, find growth to be significant and positively related with the adjustment speed towards target debt ratio. Keeping in view the important contribution of growth in adjusting towards target capital structure, it is being considered in this study.

Distance between the observed leverage and the target leverage is also worth studying because the firms that are at large distance from their target are likely to make quick adjustments even the cost of changing capital structure is high (Drobetz & Wanzenried, 2006). Firms with small distance may not make quick adjustment in presence of high adjustment cost. Haas and Peeters (2006) and Mukherjee and Mahakud (2010) report positive significant impact of distance on adjustment speed while Haron *et al*. (2013) and Banerjee, Heshmati, and Wihlborg (2004) report negative significant impact of distance on adjustment speed. The role of distance between target and actual debt levels in determining adjustment speed towards target debt in Pakistan needs further investigation due to inconsistency in the findings of earlier studies.

Size is expected to be relevant to adjustment speed and is being considered in this study because change in capital structure involves large fixed cost which can be relatively small

for the large firms. Haron *et al*. (2013) and Mukherjee and Mahakud (2010) report the positive significant effect of size on adjustment speed. Chipeta and Mbululu (2013) find negative significant relationship of size with adjustment speed. Given the significance of the size and inconsistencies in findings, it is important to consider it as the explanatory variable of adjustment speed in this study for Pakistan.

Profitability is being considered in this study as it ensures the availability of internal funds that can elevate the adjustment speed towards the target leverage ratio; hence establishing the positive association with speed of adjustment. Haron *et al*. (2013) finds the significant positive impact of profitability on speed of adjustment. Heshmati (2001) reports negative significant impact of profitability on the adjustment speed for a sample of small Swedish firms. So these conflicting results provide the basis to consider profitability as the explanatory variable of adjustment speed in this study.

Effective tax rate is also being considered in this study as the determinant of adjustment speed because it has direct impact on the amount of leverage gain (debt tax shield). Oztekin (2013) confirms the positive significant relationship between the tax benefit of using debt and speed of adjustment towards target debt ratio. Clark *et al*. (2009) finds the positive significant relationship of tax rates with the speed of adjustment for developing countries sample. To get further insights into the role of effective tax rate in adjustment speed, it is being investigated in this study for Pakistan.

As stated by Frank and Goyal (2009) and Korajczyk and Levy (2003) the adjustment cost towards target should be lower in good economic conditions. Hence the adjustment speed may be high. Few studies such as Haas and Peeters (2006) and Clark *et al.* (2009) report GDP growth as significantly affecting the speed of adjustment towards optimal capital structure. Besides the GDP growth rate, stock market development also may affect the adjustment speed. Clark *et al*. (2009) argue that the financial market development enhances the market efficiency and reduces the cost of external financing hence increasing the adjustment speed. Clark *et al.* (2009) report stock market development an important factor and it has significant positive effect on adjustment speed towards target leverage ratio. Given these arguments and limited use of stock market development in earlier studies, it is considered in this study as the determinant of adjustment speed to properly understand the impact.

Drobetz and Wanzenried (2006) and Drobetz , Pensa, and Wanzenried, (2007) argue that upward sloping term structure of interest rate, together with low interest rate is the indicator of the economic expansion. Firms move rapidly towards target debt ratios when favorable macroeconomic conditions exist and interest rates are low. Drobetz and Wanzenried (2006), Haas and Peeters (2006), and Drobetz *et al.* (2007) find negative significant relationship of interest rates with adjustment speed. Given this it is worth considering the level of interest rates as the determinant of adjustment speed.

Given the reality of non existence of the studies on optimal leverage, dynamic behavior of capital structure, and problems of over financing with debt in Pakistan, and importance of the explanatory variables of optimal capital structure and speed of adjustment, it is worth conducting this study for Pakistan.

1.3 Research Questions

This study helps to answer the following research questions:

i. What is the adjustment speed of the Pakistani firms towards their target capital structure?

ii. What is the relationship between firms' optimal debt ratio and firms' profitability, tangibility, growth, tax rates, earning volatility, non-debt tax shield, cash flows, size, industry median leverage, and country specific variables of GDP growth rate, interest rates, and stock market development in Pakistan?

iii. What is the relationship between adjustment speed towards optimal capital structure and firms' growth, size, profitability, tax rates, distance between target and observed leverage, GDP, stock market performance, and interest rate in Pakistan?

1.4 Research Objectives

The specific objectives of this study are:

i. To estimate the speed of adjustment of Pakistani firms towards their target capital structure.

ii. To examine relationship between firms' optimal leverage ratio and firms' profitability, tangibility, growth, tax rates, earning volatility, non-debt tax shield, cash flows, size, industry median leverage, and country specific variables of GDP growth rate, interest rates, and stock market development in Pakistan.

iii. To investigate the relationship between speed of adjustment towards optimal capital structure and firms' growth, size, profitability, tax rates, distance between target and observed leverage, GDP, stock market performance, and interest rate in Pakistan.

1.5 Scope of Research

This study is aimed at understanding the speed of adjustment towards target capital structure, investigating the determinants of target capital structure, and factors affecting the speed of adjustment towards optimal capital structure of the non financial listed firms of Karachi Stock Exchange (KSE) of Pakistan. All non financial firms (456 firms)[5] were supposed to be considered in this study; but Datastream database has the financial data of 271 listed firms (both financial and non financial). Excluding the firms from the financial sector and the firms having the data of less than 3 years, this study uses a sample of 143 non financial listed firms. The study uses the secondary data regarding the firm specific and country specific variables from 2003-2012.

[5] Manually compiled on October 18, 2013 from www.kse.com.pk

1.6 Significance of Research

Recent empirical studies in area of corporate capital structures agree on the importance of target capital structure and report that the firms in developed countries adjust towards it with certain adjustment speed (Ozkan, 2001; Banerjee *et al*., 2004; and Drobetz, Schilling, & Schroder, 2014). Denis (2012) also endorses the applicability and acceptance of dynamic models in explaining the firms' capital structure behaviors. Hovakimian and Li (2009) state that adjustment speed towards target debt has recently become the hot issue in capital structure literature. However, this important area of capital structure decisions is not explored for Pakistan. The problems of over use of debt by firms, increasing non performing loans of banking sector, and increasing bankruptcies further compliments the investigation of capital structure decisions in Pakistan. This study focuses on non financial public corporations of Pakistan, a developing country for which the literature in the field of dynamic capital structure (adjustment speed towards optimal debt and its determinants) is almost non-existent. Besides, this study also examines the determinants of target capital structure using partial adjustment model instead of static models.

Furthermore, in determining the factors affecting corporate debt, this study uses some additional firm and country specific macroeconomic variables such as cash, corporate tax rates, interest rates, and stock market performance. These variables, as per the researcher's knowledge, have not been used in previous studies of determinants of capital structure of Pakistan. This study also uses latest dataset (2003-2012) to understand this important field of corporate finance in Pakistan. This study also uses different proxies of

the book leverage such as total liabilities and total debt not used previously for Pakistan, to analyze the significance of various variables in estimating adjustment speed and determining the factors affecting adjustment speed and target debt.

This research is useful for corporate financial managers in Pakistan in understanding the important factors that are affecting the financing decisions, particularly the debt levels and adjustment speed, and accordingly decide the debt levels and monitor their adjustment speed. The findings provide some control to the corporate financial managers in form of the identification of factors affecting target debt and adjustment speed towards it. Based on the findings of this study policymakers in Pakistan may also get insight in corporate financing decision, take measures to develop equity and bond market, frame macroeconomic policies conducive for enhancing adjustment speed, and develop mechanism to monitor the firms financing decisions to avoid the corporate bankruptcies. Policymakers and other stakeholders can develop policies and laws to facilitate the firms to adjust to the target debt levels easily. The investors and creditors may find the results of this research helpful by understanding the factors affecting corporate borrowing decisions and the adjustment speed towards target capital structure.

1.7 Summary and Organization of the Thesis

Given the importance of financing decisions, it is necessary to investigate empirically and understand the dynamics of capital structure. Empirical work done in developed countries regarding the dynamics of capital structure and theories based on it cannot be generalized

for developing countries. Very little work with limited variables is available to understand the dynamic aspect of capital structure for developing countries, especially for Pakistan. This study investigates the existence of optimal debt, determines the factors affecting optimal capital structure, estimates the adjustment speed towards optimal capital structure, and determines the factors affecting the speed of adjustment towards target debt.

Remaining sections of this thesis comprise of the four more chapters. The second chapter discusses the financial markets in Pakistan, capital structure, underpinning theories, determinants of capital structure, and determinants of speed of adjustment towards target debt ratio, and the empirical evidences on the issue of capital structure and adjustment speed towards optimal debt. The third chapter is about the research methodology and discusses the research design, hypothesis development, and the measurement of the variables. Chapter four presents and discusses the findings of this study. It provides the descriptive statistics of the variables, results regarding the multicollinearity of the data, presents and discusses the results regarding the magnitude of adjustment speed and factors affecting the adjustment speed towards target capital structure for Pakistani firms. Furthermore, the fourth chapter also presents and discusses the factors affecting the optimal capital structure. Chapter five summarizes the study by reiterating the objectives and motivation for the study, presenting the summary of the findings, discussing the implications of the findings for various stakeholders, describing the limitations of this study and recommendations for future research, and highlighting the contribution made by this study.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter discusses the financial markets of Pakistan, capital structure and determinants of capital structure, underpinning theories of capital structure, and determinants of the adjustment speed towards target capital structure with empirical evidences.

2.1. Financial Market of Pakistan

Companies, governments, and individuals need capital to buy the assets. Simultaneously there are individuals and organizations that are having funds more than their current needs, and they want to make investments to meet their future needs. Financial markets bring together both types of groups to satisfy their needs (Brigham & Houston, 2001). Financial market may be classified in different ways. It can be classified on the basis of the types of securities issued such as debt market and equity market. It can also be categorized on the basis of the maturity claims. The market for short term debt is called money market and the market for longer term maturity of financial assets is called capital market. The market for newly issued securities is called primary market and market for previously issued securities is called secondary market. Financial markets can also be categorized on the basis of organizational structure like over-the-counter market, auction market, and intermediated markets (Fabozi & Modigliani, 1992).

The most important market in any economy is the capital market which enables suppliers and users of the funds to negotiate the terms and conditions of the transfer of funds. The transfer of funds may be permanent in form of equity against the residual profitability and temporary in form of debt for specified period against promised returns (Perison, Brown, Howard, & Pinder, 2012).

2.1.1 Capital Market of Pakistan

The capital market of Pakistan comprises of stock (equity) market and debt market.

2.1.1.1 Stock Market of Pakistan

At present three stock exchanges are working in Pakistan. The most important and the oldest stock exchange of Pakistan is Karachi Stock Exchange (KSE), which was established on 18th September 1947 that is immediately after the independence of the country. Two other stock exchanges are Islamabad Stock Exchange (ISE) and Lahore Stock Exchange (LSE). Iqbal (2012) reports that 85 percent of the total trading of the stocks in the country takes place in KSE[6].

Pakistan stock markets, particularly KSE, have shown a marvelous performance during the financial year 2012-2013. Moreover, KSE 100 index has shown a growth rate of 30.7% in first nine months of the fiscal year of 2012-2013. It has outperformed many regional and international stock exchanges like S&P 500, which grew by 15.2% and

[6] www.kse.com.pk can be visited for recent updates about the Karachi Stock Exchange.

India's Bombay Senses Index that grew by 8.1% in the same period (Ministry of Finance, Pakistan, 2012-2013). As reported in World Bank's Development Indicators Report (2013), a total of 573 companies are listed in Karachi Stock Exchange with market capitalization of USD 43.68 billion. Market capitalization of equity market in Pakistan stood at 19.5 percent of GDP (World Bank, 2013)[7]. It has attracted good foreign investment due to its outstanding performance and reforms introduced by Securities Exchange Commission of Pakistan. Some of the recent steps taken are demutualization of the Stock Exchanges, decline in discount rate by State Bank of Pakistan (SBP), implementation of capital gain taxes, code of corporate governance, and introduction of odd lot market.

Iqbal (2012) further reports that the contribution of stock market in Pakistan, in creating economic activity, is not up to the mark due to the small size of the market, high volatility, high concentration of trading, and low integration with global markets.

2.1.1.2 Debt Market of Pakistan

The corporate bond market of Pakistan is not very developed. It only accounts for less than 1% of GDP while in US the bond market accounts for 175% of GDP and in Japan 198% of GDP (Saleem, 2013)[8]. The corporations heavily rely on banking sector for

[7] World development Indicators is a database of World Bank and can be accessed at http://data.worldbank.org/

[8] News paper article published in daily Business Recorder, daily financial newspaper of Pakistan. Details of article on corporate debt market in Pakistan can be read at this newspaper's website as given in references. http://www.brecorder.com/supplements/88/1148862/. The information was retrieved on November 12, 2013.

borrowing in Pakistan. It is direly needed to develop bond market in Pakistan to provide competition to banking sector in corporate lending. Since the inception of corporate bond market in 1995, the corporate sector of Pakistan has issued only 109 Term Finance Certificates (TFCs), a debt instrument in Pakistan's bond market, of worth Rs 110 billion. As of June 2011 the TFC's worth of Rs 68 billion were outstanding. In comparison to this the outstanding domestic debt of government was at Rs 6,226.4 billion at the same date (Saleem, 2013).

Some of the hurdles in the way of the development of the efficient corporate debt market in Pakistan are non existence of technical skills, absence of a formal separate trading platform similar to equity markets, less liquidity leading to ineffective price setting mechanism, and absence of proper settlement procedures. The development of bond market in Pakistan requires the collaboration of the State Bank of Pakistan, Securities Exchange Commission, Ministry of Finance, and Federal Board of Revenue to work-out the effective mechanism of trading and price setting, provision of liquid market, establishment of central settlement system, and setting proper taxation system for bond income. It is also needed to offer incentives and help corporate sector to design innovative debt securities. Simplifying the bond shelf registration procedures, issuing mechanism, and reducing the time and cost involved will further help to develop the corporate bond market in the country.

2.2 Capital Structure Defined

A company's capital structure is defined as the amount of short term debt, long term debt, preferred stock, and common equity used to finance operations and new projects (Moyer, McGuigan, & Kretlew, 2003). Generally capital structure is known as the mix of debt and equity that a company uses to finance its business (Clayman, Fridson, &Troughton, 2008). Brealey, Myers, and Marcus (2009) define capital structure as the "mix of long-term debt and equity financing". The objective of the capital structure decision is to determine the financial leverage (level of debt) or capital structure that maximizes the value of the firm by minimizing the weighted average cost of capital (WACC). Optimal capital structure is that level of debt where WACC is minimum and firms' value is maximum (Brigham & Ehrhardt, 2005).

The use of debt can decrease the firms' WACC in two ways. First, the debt holders usually receive the fixed interest payment which is normally lower than the cost of equity. The return to equity holders is not fixed. It is the obligation of the firm to make the interest payments to debt holders, failure to do so may lead to bankruptcy. It is not obligation to pay the dividends to equity holders. This shows that the debt is less risky for investors than the equity so they charge lower interest. Second benefit of using debt is that the interest paid to debt holders is shown as an expense in the income statement and reduces the taxable income. It provides tax savings to the firm. This tax deductibility of interest reduces the effective cost of capital (WACC) for the firm and increases the value of the firm.

The use of debt may not be good always (Raymond, 2012). It magnifies both gains and losses. The amount of debt used in one way may depend upon the performance of the firm. If a firm is heavily debt financed and in particular year it does not do well and becomes unable to meet the debt obligations, it can be declared bankrupt. Nonpayment of the interest or principal may bring bankruptcy to the firm. This is the main disadvantage of using debt. This is more likely to happen when a firm uses high amount of debt. Since the firms operate in competitive world so the performance cannot be guaranteed in most of the cases.

Firms are concerned with using an optimal level of debt where they can maximize the advantages of using debt and minimize the chances and costs of bankruptcy. The different factors are said to determine the debt level in capital structure of the firms. Some of them are firm specific factors such as firms' profitability, asset structure, tax rate, business risk, size and others. The other factors are industry and country specific such as the industry type, industry median leverage, GDP growth rate, inflation rate, interest rates, bond market development, stock market development, bankruptcy laws, tax laws, creditors and equity holders' protection and others.

2.3 Underpinning Theories of Capital Structure

This section discusses some of the important theories emerged so far on capital structure decisions, and that provide the basis for this empirical research.

2.3.1 The Modigliani-Miller (MM) Capital Structure Theory

This theory of Capital structure is considered to be the first ever theory on the issue of financial leverage. Modigliani and Miller (1958), on the basis of some impractical assumptions, concluded that use of the debt by the firm has no effect on the firms' overall cost of capital and its value. They further indicated that the value of the firm is affected by the firms' investment decisions not by the financing decisions. In perfect capital market they identified the arbitrage opportunities if the value of the firm is influenced by its financing decisions. They came up with these findings on the basis of the assumptions like firms are having constant cash flows for ever (perpetual), both investors and firms have the same access to financial markets, no corporate and individual taxes, and absence of transaction costs and bankruptcy costs. Clearly these assumptions are unrealistic but this theory provided a foundation to the researchers to investigate thoroughly this irrelevance theorem by relaxing the assumptions, and find when the financing policy can matter.

Later, Modigliani and Miller (1963) came up with the modified version of their irrelevance theory. They added the corporate taxes in their model and reported that the capital structure does matter and the use of debt may increase the value because the cost of debt is tax deductible and it effectively reduces the taxable income and firms may use 100 percent debt to maximize the value. No off setting cost of debt was considered in this paper. The impact of personal taxes was also not considered. Miller (1977) extended corporate taxes model and considered also the personal taxes. He showed that

consideration of personal taxes reduces the benefit of using debt but not eliminate that benefit. This model also guided towards the use of 100 percent leverage.

This MM theory of capital structure is deemed to be the starting point for the empirical studies of capital structure because many empirical studies are based on relaxing the assumptions of MM without tax model (1958) or MM with tax model (1963). This study is also based on testing determinants of the leverage which are in violation of the assumptions of these two versions of MM theory.

2.3.2 Trade-off Theory

Trade-off theory emerged after the modified version by Modigliani and Miller (1963), where they conclude that the firms can use 100 percent debt to maximize the value. The source of increase in value is the tax savings due to use of debt. Besides this obvious advantage of using debt, there are also disadvantages. The main disadvantage is the cost of financial distress. This theory suggests that there is the possibility of using an optimal level of financial leverage that trades-off the advantages and costs of using debt. The probability of financial distress is low at very low level of debt and increases as the amount of debt increases in capital structure. Firms' value is the highest at optimal level of debt. If the debt is increased beyond that level, the cost of financial distress outweighs the benefits of tax saving and firms' value starts decreasing (Brigham & Ehrhardt, 2005).

Kraus and Litzenberger (1973) are the first to develop a single period model that considers both the tax advantage of using debt and probable bankruptcy cost. Myers (1984) also suggests that the firms will always be at their optimal debt-equity ratio. This implies that whenever the market value of equity changes, the firms will change their capital structures to stay at optimal. Myers (1984) identifies the transaction cost incurred in doing so. The transaction cost is not identified by Kraus and Litzenberger (1973).

In financial distress two types of costs can be there, direct and indirect. Direct cost is the cost of administering the bankruptcy like legal fees and management time. Indirect cost is when the management takes un-optimal decisions such as reducing R&D, advertising, and maintenance expenses, losing customers due to uncertainty of the continuity of operations, losing key employees, and reduction in credit facility by suppliers etc. This theory of static trade-off is very famous as it reconciles the observed capital structure with the MM with tax model (1963).

Even though this static trade-off theory has several limitations but it helps corporate financial managers to understand the factors that can be important in making financing decisions. In this study, this theory helps in understanding the corporate financing behavior by providing the explanations of significance of leverage determinants used in this study such as profitability, growth, tax rates and others.

2.3.3 Dynamic Trade-off Theory

The static trade-off theory assumes an optimal (target) level of debt where the firm's value is maximized, but there are many firms that use less than or more than optimal level of debt. Dynamic trade-off theory describes that the target leverage of the firms adjusts overtime and is affected by many endogenous and exogenous factors (Getzmann *et al.*, 2010). Graham and Harvey (2001), in a survey study, revealed that firms' managers seek a target debt-equity ratio; but due to random events they may temporarily move away from optimal debt ratio. Fischer *et al.* (1989) found that firms unreceptively build up earnings and losses that move their leverage ratios away from the target. Firms may allow this deviation from the target because of market imperfections, information asymmetries, and transaction costs. But, when there is large deviation from targets, the managers may take steps to bring back the companies to their target debt ratios in order to take benefit of tax shield and increase the value of their firms. According to this approach, firms' actual debt ratios will converge to the target ratios over time. This is known as the dynamic trade-off theory.

Fischer *et al.* (1989) are assumed to be the originators of the dynamic trade-off theory because they are the one who first developed a model that allows the deviation from target capital structure. Dynamic trade-off model considers capital structure of the firms as the continuous decision that takes care of the trade-off between the tax advantage of debt, possible cost of financial distress, and firms' investment decisions and restructuring costs. Financial restructuring cost may hamper the immediate adjustment towards target and may cause firms to move away from their target capital structure for longer periods.

Titman and Tsyplakov (2007) develop a model and find that firms do have an optimal capital structure and they adjust towards it. But, speed of adjustment is different for companies. Companies are likely to adjust immediately if there is no adjustment cost or the cost of adjustment is lower than the financial distress and possible bankruptcy cost.

For this study, the dynamic trade-off theory helps in developing the underlying framework as it is assumed that firms adjust towards specific optimal but a moving target debt. The theory is also expected to be helpful in explaining the empirical results regarding the adjustment speed and factors affecting adjustment speed in Pakistan.

2.3.4 Pecking Order Theory

Regarding the ways capital structures are actually established in US firms, Donaldson (1961) conducted an extensive survey. According to the findings of this survey, managers in US prefer to use internal source of financing rather than raising funds externally by issuing shares or borrowing. He observes a hierarchy or pecking order of raising finances. According to this pecking order, firms first meet the funds requirement by internal finance (selling liquid assets or retained earnings) followed by external funds raised through borrowing, hybrid securities, and finally issuing ordinary shares.

Later, Myers and Majluf (1984) also indicated that whenever managers issue shares instead of debt, the investors discount the share prices. The possible explanation of this finding may be the information asymmetry which causes the adverse selection cost. The

adverse selection cost may arise from the decrease in firm's stock price when the equity is issued as the investors may assume the overvaluation of the firm's shares. According to these findings managers will avoid issuing shares and follow pecking order of first meeting funds requirement internally, than issuing debt and finally as a last resort issuing equity.

According to pecking order theory, companies will prefer the least expensive source of financing when they need funds for investments. Being the cheapest source of funding, companies will prefer internal funding such as retained earnings as their preferred mode of financing followed by debt issuance, convertible bonds, and then issuing equity (Myers, 1984). Lucas and McDonald (1990) point out the dynamic version of pecking order theory. This theory implies that equity is issued by the managers following the high market performance periods. So, market performance is expected to decrease the probability of debt issues and observed debt ratios.

In this study, pecking order theory helps in understanding the corporate financing behavior from a different perspective as it considers the tax benefit of debt financing as second order effect. This theory further aids in providing an alternative context for explaining significance of some of the leverage determinants used in this study such as profitability, growth, cash flows and others.

2.3.5 Market Timing Theory

According to the market timing theory, managers tend to issue equity when they believe that the stock is overvalued and they tend to buy back shares when they perceive the stocks to be undervalued. This means that the stock price tends to affect the capital structure. This can happen in two ways. First, managers release the positive information that reduces the information asymmetry and stock price increases. After the increase in prices; shares are issued. This assumes that stakeholders behave rationally. Second situation is one where the stakeholders behave irrationally (Baker and Wurgler, 2002) and the stock is mispriced. So, managers are likely to issue shares when they believe the cost of equity capital is low and bond market condition is not favorable. They buy back the shares when the share price is low and consequently the cost of equity capital is high. In a study by Graham and Harvey (2001), it is admitted by the managers that they tend to time the market; meaning that the firms' stock price is one of the main considerations in capital structure decisions.

For this study, Market Timing Theory is useful in understanding the corporate financing behavior by providing the explanations of significance of some leverage determinants used in this study such as stock market development.

2.3.6 Agency Cost Theory

The agency cost is defined by Jensen and Meckling (1976) as the sum of the costs such as monitoring, bonding, and residual loss incurred by the stakeholders. Agency cost is also supposed to be the one of important factors influencing capital structure (Harris & Raviv,

1991). Agency problems can arise in three forms; asset substitution (risk shifting), free cash flow hypothesis, and underinvestment problem.

Managers may expropriate bondholders' wealth in interest of the stockholders by making the risky investments. Risky investments increase the risk of bondholders more than the stockholders. In expectation of this expropriation the bondholders may require premium that may discourage the use of debt. This problem is known as risk shifting or assets substitution.

The leveraged firms' management is likely to play safe and may forego even some positive net present value (NPV) projects. When the debt comes due, the stockholders, who provide the funds, may not get proceeds of valuable projects because the management may refuse to accept positive value projects ex post reducing firm value ex ante. As argued by Brealey and Myers (2000), all leveraged firms may have this underinvestment problem but it is more prominent for highly leveraged firms. The higher the probability of default the higher will be the gain for bondholders from the value increasing projects. This underinvestment problem discourages the use of leverage.

The use of the high debt by the firms having high stable operating cash flows can increase the firms' value through improvement of the financial discipline (Easterbrook, 1984; Jensen, 1986). To avoid the conflict between stockholders and management, firms may use the debt to bring the financial discipline by reducing the chances of using cash in

non value maximizing activities by management. The use of debt requires obligatory payments of interest and principal amount that make managers cautious in using the cash.

Agency cost theory may be helpful in providing a different contextual framework for understanding the significance of the some of the leverage variables used in this study such as profitability, growth, and cash flows.

All these theories of capital structure, which have emerged over time, provide different insights in understanding the capital structure. The MM theory supposed to be the starting point and is helpful in understanding the importance of capital structure. Trade-off Theory that considers both benefits and disadvantages of using debt may aid in providing the explanations of empirical results regarding leverage determinants. Dynamic trade-off theory provides framework for this study and helpful in explaining the empirical results regarding the adjustment speed and factors affecting adjustment speed in Pakistan. Pecking Order theory is helpful in understanding the corporate financing behavior from a different perspective as it considers the tax benefit of debt financing as second order effect. It provides an alternative context for explaining some leverage determinants such as profitability, growth, cash flows and others. Market Timing Theory explains the opportunistic behavior of the firms and may help in explaining some leverage determinants such as stock market development. Similarly, agency cost theory may possibly provide alternative context for explanation of the significance of some variables such as profitability, growth, and cash flows.

2.4 Determinants of the Capital Structure

Factors determining the optimal capital structure can be categorized into three groups; firm specific, industry specific, and the country level factors. This section only discusses those determinants of capital structure which are considered in this study according to these categories.

2.4.1 Firm Specific Determinants of Capital Structure

There is a list of firm specific variables that have been used in empirical studies. Following are the firm specific factors which are being considered in this study and seem to logically affect the debt level in capital structures of the firms.

2.4.1.1 Tangibility

Tangible means something having physical form. For the firms, the ratio of fixed assets to total assets is called tangibility. Organizations do hold both tangible and intangible assets. The tangible assets include fixed assets like property, plant, equipments, and the inventory. The intangible assets include patents, copy rights, goodwill, and brand recognition. Companies having high proportion of tangible assets are likely to use more debt than the companies having low proportion of tangible assets because tangible assets are easier to sell and can be sold separately from the companies as a whole. The tangible assets can also be used by the firms as collateral (De Jong *et al.,* 2008). The problem of wealth transfer from bondholders to shareholders can also be avoided through collateral. Both of these facts reduce the lenders risk. Service firms like advertising agencies and

consulting firms are largely financed with equity due to insufficient amount of tangible assets. Frank and Shen (2013) find the tangibility as one of the four most important factors determining the debt levels.

Significance of tangibility in explaining the leverage has been confirmed in many studies. Studies of Rajan and Zingales (1995), Heshmati (2001), Flannery and Rangan (2006), De Jong *et al.* (2008), Sheikh and Wang (2012), Haron *et al.* (2013), and many others given in Table 2.1 confirm the positive significant impact of tangibility on leverage. Mustapha *et al.* (2011) report the positive significant relationship of tangibility with leverage for Malaysian firms. The positive significance relationship supports the argument that tangibility reduces the risk of lenders because the tangible assets are used as the collateral (Bas, Muradoglu, & Phylaktis, 2009) and the probability of shareholders-debt holders conflict is reduced (Delcoure, 2007). Some studies such as Titman and Wessels (1988), Mukherjee and Mahakud (2010) and Saarani and Shahdan (2013) have reported either negative impact or no influence of tangibility on leverage. Negative relationship support the argument that firms with fewer amounts of tangible assets may voluntarily choose higher level of debt to avoid excessive privileges by the management (Drobetz & Wanzenried, 2006).

Table 2.1

Empirical Evidences of Relationship of Tangibility with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Titman & Wessels (1988)	US	469 firms from 1974 to 1982	Tangibility has insignificant effect and varying signs with different measures of leverage.
Rajan & Zingales (1995)	US, UK, Canada, France, Germany, Italy, Japan (G-7 countries)	Data from 1987-1991 of 2583 Firms of G-7 countries	Tangibility is reported to be positively related and significant in majority of the countries.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Positive significant relationship of tangibility is reported with leverage.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Tangibility is positively related to leverage. Significance is established in half of regressions.
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Using Fama-MacBeth (1973) estimates, tangibility is found to be significant and positively related with leverage.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Tangibility has significant positive impact on optimal leverage.
Delcoure (2007)	Russia, Czech Republic, Poland. Slovak republic	129 firms data from 1996-2003	Positive significant relationship is reported between tangibility and leverage for all countries.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	Tangibility is positively related. Level of significance varies across countries.

Table 2.1 (*continued*)

Author	**Country**	**Sample (Period)**	**Key Findings**
De Jong *et al.* (2008)	42 countries including both developed and developing	11845 firms comprising of 59225 firm years from 1997-2001	Tangibility is having significant and positive relationship with leverage in 36 countries.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	Mixed and inconclusive results regarding the relationship of tangibility with leverage are reported.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Significant negative relationship of tangibility is reported with both market and book value leverages.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Positive significant relationship of tangibility for three out of four measures of leverage has been reported.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	Tangibility has positive significant effect on both measures of leverage.

2.4.1.2 Firm's Growth

Firms' growth rate, measured in different ways, is likely to affect leverage decisions of the firms. Harris and Raviv (1991) conclude that the literature agrees that use of the debt increases with growth opportunities. Myers (1977) argues that firms with high level of debt are likely to shun profitable investment (growth) opportunities. So firms having high future expected growth rates are likely to protect their future growth opportunities and use less debt (Cook & Tang, 2010). The higher value may come from intangible growth opportunities. Since the shareholders have high flexibility in choosing the investment thus increasing the chances of expropriating wealth from debt holders, the agency cost of debt is high for the firms growing fast (Titman & Wessels, 1988). This also implies the inverse relationship between growth and debt. Trade-off theory predicts negative relationship of growth with debt because the cost of financial distress is high for the growth firms (Antoniou *et al.*, 2008). Since high growth firms need more capital, pecking order theory predicts the positive relationship of growth with leverage if the information asymmetry and transaction costs are higher for equity than debt (Bhaduri, 2002).

Many of empirical evidences, as given in Table 2.2, confirm the negative significant relationship of leverage with growth in line with the predictions of trade-off theory and information asymmetries. Some of them are Rajan and Zingales (1995), Heshmati (2001), Drobetz and Fix (2005), De Jong *et al*. (2008), Chang, Lee, and Lee (2009), and Fan *et al.* (2012). Positive or no relationship is also reported in some studies such as Titman and Wessels (1988), Banerjee *et al.* (2004), Ameer (2013), Mustapha *et al.* (2011), and Haron *et al*. (2013). Their findings are aligned with the predictions of pecking order theory.

Table 2.2
Empirical Evidences of Relationship of Growth with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Titman & Wessels (1988)	USA	469 firms from 1974 to 1982	Growth is insignificant in determining the market value leverage with negative sign. However it has positive significant impact with one measure of book value leverage.
Rajan & Zingales (1995)	US, UK, Canada, France, Germany, Italy, Japan (G-7 countries)	Data from 1987-1991 of 2583 Firms of G-7 countries	Growth is consistently significant and negatively related with market value of leverage.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative significant relationship of growth is reported with leverage.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Impact of growth is significant and negatively related to leverage.
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Using Fama MacBeth (1973) estimates, growth is found to be insignificant and negatively related with leverage.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Growth has negative impact on optimal leverage. Significance is established for market value optimal debt.
De Jong *et al.* (2008)	42 countries including both developed and developing	11845 firms comprising of 59225 firm years from 1997-2001	Growth is having significant and negative impact on leverage in 24 countries.

Table 2.2 (*continued*)

Author	**Country**	**Sample (Period)**	**Key Findings**
Chakraborty (2010)	India	Balanced panel of 1169 firms listed at Bombay Stock Exchange from 1995-2008.	Using difference GMM, growth has negative significant impact on leverage in only one model using percentage change in total assets as the measure.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	OLS reports significant positive relationship of growth with target leverage for full sample and sub samples. FE and GMM report significant negative relationship.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Negative significant relationship of growth with both market and book value debt is reported.
Fan *et al.* (2012)	39 countries including both developed and developing	The data of 16 years from 1991-2006 of 36767 firms with 272,092 firm year observations in 39 countries has been taken.	Negative and significant relationship of growth with leverage is reported.
Haron *et al.*(2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Inconsistency in relationship of growth with leverage. Both positive and negative significant relationships are reported for different measures of leverage.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	Growth has positive significant effect on one measure of leverage and negative significant impact for other.

2.4.1.3 Size of the Firm

The size of the firm, measured in terms of sales or assets, may have paradoxical effect on use of the debt. Large firms may be more diversified than small firms and their chances of failure are low (Drobetz & Fix, 2005). Titman and Wessels (1988) argue that fixed direct bankruptcy cost for large firms will be a smaller portion of firm's value, which reduces the cost of borrowing. These firms have low monitoring cost, less volatile cash flows, and easier access to credit market. If it is so than the probability of being bankrupt is also low for large firms. Warner (1977) and Ang *et al*. (1982) reported the bankruptcy costs to be high for small firms (Drobetz & Wanzenried, 2006). Consequently trade-off theory suggests that large firms are likely to use more debt than small firms. Rajan and Zingales (1995) suggest that, in line with the pecking order theory, the relationship between size and use of debt can also be negative because the asymmetric information problem may be negative for large firms and they can prefer to issue equity. Size may be the proxy of the information for outsiders, so it may increase the preference for equity rather than debt.

As shown in Table 2.3, size is significantly positively related with leverage in many empirical studies such as Rajan and Zingales (1995), Krishnan and Moyers (1997), Drobetz and Wanzenried (2006), Drobetz *et al.* (2007), De Jong *et al.* (2008), Ameer (2013), Chen and Chen (2011), and Haron *et al.* (2013). They support the argument of low bankruptcy cost and they are in line with the predictions of trade off theory. In sub samples of the some studies or for different measures of leverage, negative relationship of size has also been reported in some studies such as Banerjee *et al.* (2004), Delcoure

(2007), De Jong *et al.* (2008), Mukherjee and Mahakud (2010), and Cashman *et al.* (2013). Negative relationship of these studies is supported by the pecking order theory.

2.4.1.4 Profitability

Profitability is, perhaps, the most commonly used determinant of the leverage in empirical studies. Profitability is the bottom line result of the firm. The ratio of EBIT to total assets or the ratio of operating profit to total assets are usually considered as the profitability measures. Profitability increases equity both in book value and market value (Oztekin 2013). Titman and Wessels (1988) argue that the profitability is the main determinant of capital structure as it indicates the level of earnings to be retained for meeting the capital needs.

The impact of profitability on use of the debt is also unclear. The static trade-off theory and pecking order theory consider the profitability to be the important determinants of leverage (Booth *et al.*, 2001). Negative relationship of profitability is predicted with leverage by Myers and Majluf (1984) because firms will prefer to finance with internal funds rather than debt (pecking order theory). The profitable firms may use lower leverage and finance their projects with internal equity to avoid the dilution of ownership.

However positive relationship is predicted by Jensen (1986), if the market for corporate control is effective. Agency theory suggests the positive relationship between profitability and debt level (Drobetz & Fix, 2005). Trade-off theory may also establish the positive relationship between profitability and leverage based on the argument

Table 2.3

Empirical Evidences of Relationship of Size with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Rajan & Zingales (1995)	US, UK, Canada, France, Germany, Italy, Japan (G-7 countries)	Data from 1987-1991 of 2583 Firms of G-7 countries	Size is found to be positively related in all countries except Germany. Significance is established in majority of countries.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Size is positively related to leverage but relationship is insignificant.
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Size is found to be insignificant and positively related with leverage using Fama MacBeth (1973) estimates.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Size has significant positive impact on optimal leverage.
Delcoure (2007)	Russia, Czech Republic, Poland. Slovak republic	129 firms data from 1996-2003	Positive significant relationship is reported between short term debt and size of the firm. Negative relationship with long term debt is reported for all countries except Russia.
Antoniou *et al.*(2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	Firm size is positively related and significant in all countries except US.
De Jong *et al.* (2008)	42 countries including both developed and developing	11845 firms comprising of 59225 firm years from 1997-2001	Size is having significant and positive relationship with leverage in 21 countries and significant negative in 14 countries.

Table 2.3 (*continued*)

Author	**Country**	**Sample (Period)**	**Key Findings**
Chakraborty (2010)	India	Balanced panel of 1169 firms listed at Bombay Stock Exchange from 1995-2008.	Using difference GMM, firm size has negative significant impact on leverage in all four models.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	Size is found to be significant and positively related with leverage.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Significant impact of size for both market and book value leverage is reported. But relationship with market leverage is positive and book leverage is negative.
Fan *et al.* (2012)	39 countries including both developed and developing	Data of 16 years from 1991-2006 of 36767 firms with 272,092 firm year observations	Positive and significant relationship of size with leverage is reported.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Positive significant relationship of size for three out of four measures of leverage has been reported.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	Size has positive significant effect on one proxy of leverage and negative significant impact for other proxy.

that the profitable firms may have low probability of bankruptcy and high tax shields (Getzmann *et al*., 2010).

As given in Table 2.4, negative significant relationship of profitability is confirmed in many empirical studies such as Rajan and Zingales (1995), Heshmati (2001), Baker and Wurgler (2002), Banerjee *et al.* (2004), Flannery and Rangan (2006), Drobetz *et al.* (2007), De Jong *et al.* (2008), Fan *et al.* (2012), and Haron *et al.* (2013). Getzmann *et al.* (2010) find profitability to be negatively related in all industries in their sample. However significance is established in some industries. Ilyas (2008) and Sheikh and Wang (2012) report negative significant relationship of profitability with leverage for Pakistan. Mustapha *et al.* (2011), Ting and Lean (2011), and Saarani and Shahdan (2013) also report negative significant relationship of profitability with leverage for Malaysian firms. These findings of negative relationship are supported by pecking order theory. However Hovakimian *et al.* (2004) find the positive relationship of profitability with leverage which is in line with predictions of trade off theory.

2.4.1.5 Business Risk (Earning Volatility)

The trade-off theory considers the business risk (volatility of earnings) as one of the factors affecting the capital structure. The higher the earnings' volatility the higher will be the probability of the bankruptcy of a firm (Drobetz & Fix, 2005). In time of the low

Table 2.4
Empirical Evidences of Relationship of Profitability with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Titman & Wessels (1988)	USA	469 firms from 1974 to 1982	Profitability has negative significant impact on one out of six measures of leverage.
Rajan & Zingales (1995)	US, UK, Canada, France, Germany, Italy, Japan (G-7 countries)	Data from 1987-1991 of 2583 Firms of G-7 countries	Profitability is found to be negatively correlated in all G-7 Countries except Germany. Significant impact in majority of countries is reported.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative significant relationship of profitability is reported with leverage.
Hovakimian *et al.* (2004)	Compustat Industrial full coverage file firms	Data from 1982-2000 for firms having debt issues (10216 firms), equity issues (2082 firms) and dual issues (1689 firms)	Equity is issued by unprofitable firms to offset the excess debt due to accumulated losses; hence establishing positive relationship with debt.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Profitability is significantly negatively related to leverage in OLS estimation.
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Profitability is significant and negatively related with leverage using Fama MacBeth (1973) estimation.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Profitability has significant negative impact on optimal leverage.

Table 2.4 (*continued*)

Author	Country	Sample (Period)	Key Findings
Delcoure (2007)	Russia, Czech Republic, Poland, Slovak republic	129 firms' data from 1996-2003	Negative and significant relationship of profitability with leverage is reported.
De Jong *et al.*(2008)	42 countries including both developed and developing	Sample of 11845 firms comprising of 59225 firm years from 1997-2001	Profitability is having significant and negative relationship with leverage in 25 countries.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data from 1987-2000	In pooled analysis profitability is negatively related with debt. Some cross country variations exist.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	Profitability is found to be significant and negatively related with leverage.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Profitability has significant negative impact on optimal leverage.
Fan *et al.* (2012)	39 countries including both developed and developing	The data of 16 years from 1991-2006 of 36767 firms with 272,092 firm year observations	Negative and significant relationship of profitability with leverage is reported.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Negative impact of profitability on optimal leverage is reported. However the results are significant for three out of four measures of leverage.
Drobetz *et al.* (2014)	US, UK, Canada, France, Germany, Italy, Japan (G-7 countries)	Panel data of 10,772 firms from 1992-2011 with 115,537 firm year observations.	Negative significant relationship of profitability with target leverage is reported for G-7 countries.

earnings, firm cannot meet its interest obligations. Such firms avoid using high debt. Thus, trade-off theory establishes the negative relationship of earning volatility with leverage. Agency theory predicts the positive relationship between the optimal level of leverage and income variability because the underinvestment problem decreases with the increase in earnings volatility. Frank and Goyal (2009) suggest that the pecking order theory may also establish positive relationship of earnings volatility with leverage because adverse selection may affect largely to firms with high volatile earnings, and such firms use more leverage.

As depicted in Table 2.5 empirical evidences have reported mixed findings regarding the impact of earning volatility on optimal leverage. De Jong *et al.* (2008), for some countries, report the positive significant relationship of earning volatility on optimal leverage which is in line with the pecking order theory. However for 14 countries in their sample they find negative significant impact of business risk on leverage which is in line with the trade off theory. Chang *et al.* (2009) find negative significant relationship of volatility with leverage. Insignificant positive impact of earning volatility has been found by Antoniou *et al.* (2008). Bauer (2004) report negative insignificant relationship of volatility with leverage. Haron *et al.* (2013) find insignificant and inconsistent impact of earning volatility on leverage using various measures of leverage.

Table 2.5

Empirical Evidences of Relationship of Earnings Volatility (Business Risk) with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Titman & Wessels (1988)	USA	469 firms from 1974 to 1982	Earnings volatility has insignificant negative effect for five out of six measures of leverage.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative insignificant relationship of earning volatility is reported with leverage.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Impact of volatility is insignificant and negatively related to leverage.
Delcoure (2007)	Russia, Czech Republic, Poland. Slovak republic	129 firms data from 1996-2003	Mixed results regarding the relationship between risk and leverage are reported. Hence inconclusive.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	Earning volatility is insignificant and positively related in both pooled and country wise analysis. However it is negatively related in Japan.
De Jong *et al.* (2008)	42 countries including both developed and developing	sample of 11845 firms comprising of 59225 firm years from 1997-2001	Risk is having significant and negative impact on leverage in 14 countries.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Insignificant and inconsistent impact of earnings volatility for different measures of leverage.

2.4.1.6 Non-debt Tax Shield

If firms are having large amount of non-debt tax shield, they don't need to use leverage to get benefit of tax shield (DeAngelo & Masulis, 1980). Trade off theory establishes the negative relationship between non debt tax shield and leverage (Delcoure, 2007). Bradley, Jarrel and Kim (1984) suggest that there may be a positive relationship of non-debt tax shield with debt. They put forward the argument that non-debt tax shield reflects the securability (tangibility) of the firm's assets; hence such firms with high tangibility may use more debt. Commonly considered major source of non-debt tax shield is the depreciation. High amount of depreciation and amortization expenses lessen the taxable income and save taxes to the firm. This variable is assumed to be affected by the corporate tax rates.

Regarding the impact of non-debt tax shield on leverage Table 2.6 shows that Heshmati (2001), Flannery and Rangan (2006), Drobetz *et al.* (2007), Ameer (2013), and Haron and Ibrahim (2012) find the significant negative relationship between depreciation, a measure of non-debt tax shield, and target debt ratio justifying the argument of non-debt tax shield as substitute of the debt and in line with the predictions of trade off theory. Bauer (2004) also report negative significant relationship of non debt tax shield with leverage. However positive significant relationship of non debt tax shield with leverage is reported by Delcoure (2007) and Chakraborty (2010).

Table 2.6
Empirical Evidences of Relationship of Non-Debt Tax Shield with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Titman & Wessels (1988)	USA	469 firms from 1974 to 1982	NDTS has negative insignificant effect for all six measures of leverage.
DeMiguel & Pindado (2001)	Spain	133 non financial companies of Spain from 1990-1997 with 883 observations	Negative significant impact of NDTS on optimal leverage is reported.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative significant relationship of NDTS is reported with leverage
Deesomsak *et al.* (2004)	Malaysia, Singapore, Thailand, and Australia	Data of 294 Thai, 669 Malaysian, 345 Singaporean, and 219 Australian firms from 1993-2001	NDTS is significantly negatively related with leverage.
Drobetz & Fix (2005)	Switzerland	Data of 124 Swiss firms from 2001	Impact of NDTS on leverage is insignificant.
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Using Fama-MacBeth (1973) estimates NDTS measured as Dep/TA is significant and negatively related with leverage.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	In pooled analysis NDTS is positively related with leverage and significance is found for book measure of leverage. In cross country analysis it is significant and negatively related for all countries except France.

Table 2.6 (*continued*)

Author	Country	Sample (Period)	Key Findings
Delcoure (2007)	Russia, Czech Republic, Poland. Slovak republic	129 firms data from 1996-2003	Positive and significant relationship of non debt tax shield with leverage is reported in all countries.
Chakraborty (2010)	India	Balanced panel of 1169 firms listed at Bombay Stock Exchange from 1995-2008.	Using difference GMM, non debt tax shield has positive significant impact on leverage in all four models.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	Using GMM estimation technique, NDTS is found to be significant and negatively related with leverage in pooled analysis.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Insignificant negative relationship of NDTS is reported with book value leverage and positive significant relationship with market based leverage.
Haron & Ibrahim (2012)	Malaysia	Data from 2000-2009 of 663 firms	Non debt tax shield is negatively related with leverage. The significance is reported for two out of four measures of leverage.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Negative impact of NDTS on optimal leverage is reported. However the results are significant for two out of four measures of leverage.

2.4.1.7 Cash Flows

Cash can be one of the determinants of the leverage. If firm has high cash flow it can use less leverage to finance the new projects. Availability of free cash flow may give birth to agency conflict between the management and shareholders (Jensen, 1986). The possibility of misuse of the free cash flow by management is there. So agency cost suggests that the firms having high free cash flows should use more leverage to enhance the fixed obligations for management and reduce the chances of misuse of free cash flows (De Jong, 2002). High free cash flows reduce the need of external financing (Ameer, 2013) hence pecking order theory establishes the negative relationship of free cash flows with leverage.

Despite the significant relationship reported in some empirical studies this variable has not been widely investigated. Table 2.7 shows that negative significant relationship of free cash flows has been reported by DeMiguel and Pindado (2001), Gracia and Mira (2008), Viviani (2008), and Ameer (2013). These findings of negative relationship are supported by the pecking order theory. Insignificant relationship of cash with leverage is reported by De Jong (2002) and Ting and Lean (2011).

Table 2.7

Empirical Evidences of Relationship of Cash Flows with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
DeMiguel & Pindado (2001)	Spain	133 non financial companies of Spain from 1990-1997 with 883 observations	Cash flow is found to be significant and negatively related with leverage.
De Jong (2002)	Netherland	Data from 1992/93 to 1998/99 of 132 firms with 665 firm year observations	Free cash flow is having negative insignificant influence on leverage.
Vivani (2008)	France	Sample of 410 firms. Data from 2000-2003	Cash flow has negative significant relationship with leverage.
Gracia & Mira (2008)	Spain	3569 SMEs 1995-2004	Negative significant relationship of cash flows with leverage is found.
Ameer (2013)	12 emerging economies	Data of 1396 companies from 1991-2004	Free cash flows are found to be significant and negatively related with leverage.
Ting & Lean (2011)	Malaysia	Data from 1997 to 2008 for 22 companies from each, government and non government linked companies	No impact of cash flows on both short term and long term leverage is reported.

2.4.1.8 Tax Rate

All profitable organizations pay taxes on their earnings. In majority of the countries the tax laws favor the use of debt over equity because the interest paid on debt is tax deductible corporate expense, which effectively reduces the tax bill for the firms. Feld, Heckemeyer, and Overesch (2013) in their meta study of the impact of taxes on firms' debt report that tax has substantial impact on firms' debt policy. Firms in high corporate tax bracket may be tempted to use more debt to obtain more tax shield (Brigham & Ehrhardt, 2005) hence establishing the positive relationship of tax rate with leverage. Trade-off theory identifies the possibility of financial distress and suggests a level of debt where the tax shield should not be less than bankruptcy cost of the firm. High tax rates can also provide the high non-debt tax shield to the firms (DeAngelo & Masulis, 1980). This can be considered the alternative of debt to get the tax shield. So a negative relationship of the tax rate with debt can also be established.

Table 2.8 shows that this variable has been used in limited number of studies. Krishnan and Moyers (1997) find marginally positive significant relationship of tax rate with debt. De Jong and Dijk (2007), Delcoure (2007), De Jong *et al.* (2008) for two countries in their sample, and Fan *et al.* (2012) report the positive significant relationship of leverage with tax rate supporting the argument that firms with high tax rates use more debt. Antoniou *et al.* (2008) report the negative significant relationship of tax with leverage which is supported by the argument of non-debt tax shield of DeAnglo and Masulis (1980).

Table 2.8

Empirical Evidences of Relationship of Corporate Tax rate with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Krishnan and Moyers (1997)	Singapore, Hog Kong, Korea and Malaysia	Data of 81 firms from 1988-1992.	Marginal positive significant relationship of effective tax rate with leverage is reported.
Delcoure (2007)	Russia, Czech Republic, Poland. Slovak republic	129 firms data from 1996-2003	Significant positive effect of taxes is reported in all countries.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	Effective Tax rate is significant and negatively related in pooled analysis. However it is insignificant and positively related in all countries except Japan.
De Jong *et al.* (2008)	42 countries including both developed and developing	11845 firms comprising of 59225 firm years from 1997-2001	Corporate Tax rate is having significant and negative relationship with leverage in 8 countries and significant positive for 2 countries.
Gracia & Mira (2008)	Spain	3569 SMEs 1995-2004	Effective tax rate is found to have no impact on leverage.
Fan *et al.* (2012)	39 countries including both developed and developing	Data of 16 years from 1991-2006 of 36767 firms with 272,092 firm year observations.	Positive and significant relationship of countries tax with leverage is reported in full sample and developed countries sub sample. Negative and insignificant relationship is reported in developing countries subsample.

Table 2.8 ***(continued)***

Author	Country	Sample (Period)	Key Findings
Oztekin (2013)	37 countries	15177 firms from 37 countries with 101264 firm year observations. Data from 1991-2006	Tax is found to be insignificant in determining the leverage.
Feld *et al.* (2013)	Meta Analysis of 48 studies over last 25 years.	Meta Analysis of 48 studies over last 25 years from Econlit database. Total 19 database and 1144 point estimates of tax effects on debt.	A positive marginal tax effect on debt ratio of 0.27 is predicted.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	Tax has negative insignificant effect on leverage.

2.4.2 Industry Level Determinants

Many empirical studies have reported the inter industry differences in observed debt ratios of the firms. Amongst them are Bradley *et al.* (1984), Mac Kay and Philips (2005), and Roberts (2002). The commonly used industry variables are industry classification using dummy or industry median leverage. This research uses industry median leverage to understand industry influence on optimal leverage.

2.4.2.1 Industry Median Leverage

Firms belonging to same industries are expected to have same business risk as they produce similar products, have same cost structures, and same technology. Harris and Raviv (1991) observed that industrial classification is the important factor affecting leverage and the firms belonging to different industries have different levels of debt. Flannery and Rangan (2006) argue that industry median leverage is considered in empirical studies of capital structure to take in account the industry effects not captured in the model. Frank and Goyal (2004) support the use of industry median leverage as the determinant of target debt because it works as the proxy of many factors such as intangibility, regulations, and uniqueness etc. Firms' managers may consider the industry median leverage as the benchmark for themselves and accordingly may associate their debt levels with industry median leverage. Industry effects can also reflect a set of correlated factors which may be omitted in the models. Based on this it is important to consider industry effects on leverage (Mukherjee & Mahakud, 2010). Firms belonging to industry with high median leverage may use high debt. This stance establishes the positive relationship between firm leverage and industry median leverage.

As depicted in Table 2.9 the studies by Flannery and Rangan (2006), Hanousek and Shamshur (2011), Mukherjee and Mahakud (2010), and Oztekin (2013) report the positive significant relationship between leverage and industry median leverage. These findings support the argument that firms in same industry have same characteristics and use industry median leverage as leverage benchmark for themselves (Hanousek & Shamshur, 2011).

2.4.3 Country Level Determinants

Some of the recent studies (e.g., Rajan and Zingales, 1995; Booth *et al.,* 2001; Antoniou *et al*., 2008; Beck, Demirgüç-Kunt, and Maksimovic, 2008; De Jong *et al.,* 2008) have focused on the country's characteristics role in determining the capital structure of the firms. Booth *et al*. (2001) and Rajan and Zingales (1995) conclude that despite the institutional differences in the countries the firms financing behaviors are similar across the countries. Booth *et al.* (2001) conclude that the variables affecting the leverage decisions in developed countries also seem to affect in developing countries. The country related variables used in the empirical studies are GDP growth rate, culture, development of capital market, inflation rates, interest rates, legal enforcement, financial system (Bank Vs Market) orientations, type of law (civil versus common) and others. Following is the description of country specific factors considered in this study.

Table 2.9
Empirical Evidences of Relationship of Industry Median Leverage with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Flannery & Rangan (2006)	Compustat Industrial Annual Database	Data of 12919 firms with firm year observations of 111106 from 1965-2001	Using Fama MacBeth (1973) estimates, industry median leverage is found to be significant and positively related with leverage.
Lemmon, Roberts, & Zender, (2008)	Compustat database	Non financial firm-year observations in the annual Compustat database from 1965-2003	Significant positive relationship between leverage and industry median leverage is reported.
Mukherjee and Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Positive significant impact of industry median leverage on firms' leverage has been reported.
Hanousek & Shamshur (2011)	7 countries of Eastern Europe	1996-2006	In pooled analysis significant positive relationship of industry median leverage with leverage is reported.
Oztekin & Flannery (2012)	37 countries	Firms 15177 with 105568 firm year observations. data of 16 years from 1991-2006	Industry median leverage is found to be significantly positively related with target leverage.
Oztekin (2013)	37 countries	15177 firms with 101264 firm year observations. Data from 1991-2006	Industry median leverage has positive significant relationship with leverage.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	Industry median leverage has positive significant effect on both measures of leverage.

2.4.3.1 Stock Market Development

Development of financial market plays main role in deciding between debt and equity financing (Demirguc-Kunt & Maksimovic, 1996). More developed the equity market more temptations are there for the firms to use equity. As argued by Baker and Wurgler (2002), firms' prefer equity over debt if stock market's performance increases. In many empirical studies this variable has been used as one of the determinants of the target debt ratio. If the activity in stock market of the country increases the firms' preference for issuance of the equity increases. De Jong *et al.* (2008) argued that a developed stock market offers more choices of financing and reduces the equity cost. Hence the level of stock market development inversely relates with the use of debt in capital structure.

Table 2.10 shows the results of some of the studies considering stock market development as the determinant of leverage. All studies given in Table 2.10 report the negative relationship of stock market development with optimal leverage. However, significance of the relationship is reported by De Jong *et al.* (2008), Haron and Ibrahim (2012), and Haron *et al.* (2013). These findings support the argument that developed stock market encourages the use of equity.

Table 2.10
Empirical Evidences of Relationship of Stock Market Development with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
De Jong *et al.* (2008)	42 countries including both developed and developing	Sample of 11845 firms comprising of 59225 firm years from 1997-2001	Stock market development is having significant and negative impact on leverage. It mitigates the use of leverage hence establishing negative effect.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Negative insignificant impact of stock market development on leverage has been reported. Impact is negative significant for one measure of leverage.
Kayo & Kimura (2011)	40 different countries	17,061 companies with 114788 firm years. Data has been used from 1997 through 2007	Stock market development is having insignificant negative relationship with leverage using HLM in full sample.
Haron and Ibrahim (2012)	Malaysia	Data from 2000-2009 of 663 firms	Stock market development is negatively related with leverage. The significance is reported for three out of four measures of leverage.
Haron *et al.* (2013)	Malaysia	Panel data of 790 firms listed in Bursa Malaysia 2000-2009 with 6531 firm year observations.	Negative relationship of stock market development on optimal leverage is reported. Significance is reported for one out of four measures of leverage.

2.4.3.2 Interest Rate

Interest rate is described as the lending rate. The changes in interest rate are likely to affect the capital structure decisions. Firms are likely to issue debt if the lending rate in economy is low. In a survey by Graham and Harvey (2001) firms' managers asserted that they use debt when the interest rates are low. In a similar survey by Drobetz, Pensa, and Whole (2006) managers reported to use debt when interest rates are low (Drobetz *et al.*, 2007). This is because the high interest rate increases the cost of capital and discourages the use of debt (Matemilola *et al.*, 2013). Hence the interest rates are negatively related to the level of debt used. However the positive relationship can also be there if the interest rates, which also include expected inflation, are rising (Deesomsak *et al.*, 2004). In this situation firms may prefer to borrow.

Table 2.11 shows that the empirical evidences regarding the relationship of interest rates with leverage yield both negative and positive relationship. Haron and Ibrahim (2012) find negative significant relationship of interest rate with leverage supporting the argument that higher interest rates induce lower leverage. Haron *et al.* (2013) report positive significant relationship of leverage with interest rates suggesting the consideration of higher expected inflation rates. Other studies report mixed results.

Table 2.11

Empirical Evidences of Relationship of Interest with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
Deesomsak *et al.* (2004)	Malaysia, Singapore, Thailand, and Australia	Data of 294 Thai, 669 Malaysian, 345 Singaporean, and 219 Australian firms from 1993-2001	Interest rate has positive insignificant relationship with leverage for full sample. However positive significance relationship is reported in post crisis and negative insignificance in pre crisis period.
Antoniou *et al.* (2008)	Germany, Japan, France, UK, US	4,854 firms with 57,134 firm-year observations. Data form 1987-2000	Excluding Germany a significant negative impact of term structure of interest rate has been reported for all countries.
Haron and Ibrahim (2012)	Malaysia	Data from 2000-2009 of 663 firms	Interest rate is reported to have negative significant influence on leverage for two measures of leverage.
Haron *et al.*(2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Interest is found to be positively related with leverage for three out of 4 measures of leverage. Positive significance is also reported for 1 measure of leverage.

2.4.3.3 GDP Growth Rate

Gross Domestic Product (GDP) is an important indicator of any country's economic growth. It is the total monetary value of the all goods and services produced in a country within specific time period. Change in economic conditions may affect the level of debt used by the firms (Cook & Tang, 2010). De Jong *et al*. (2008) conclude that change in GDP growth is associated with change in companies' debt. Changes in economic conditions affect the capital structure dynamics as many of the factors determining leverage are affected by state of economy (Drobetz *et al*., 2014). During the surge in economic activities in any country the stock markets are likely to perform well, stock prices go up, cash increases, the chances of bankruptcy decreases, and the taxes increase. Tax benefit of debt depends upon the firm's taxable income that in fact depends upon the economic conditions. All this suggest that companies may increase the use of debt in their capital structure. Myers (1977) argues that economic growth opportunities are closely correlated with the companies' growth opportunities. So firms with high growth opportunities are likely to use less leverage; hence establishing the negative relationship between the optimal debt and GDP growth rate.

Empirical results regarding the relationship of GDP growth with leverage, as given in Table 2.12 establish both positive and negative relationships. De Jong *et al.* (2008) and Haron *et al.* (2013) report positive significant relationship of GDP with leverage which supports the argument that in good economic conditions firms use more debt. Mahmud *et al.* (2009) report GNP growth to be positively related with leverage in Japan and Malaysia. Haron and Ibrahim (2012) and Oztekin and Flannery (2012) report negative

Table 2.12
Empirical Evidences of Relationship of GDP with Optimal Leverage

Author	**Country**	**Sample (Period)**	**Key Findings**
De Jong *et al.* (2008)	42 countries including both developed and developing	Sample of 11845 firms comprising of 59225 firm years from 1997-2001	GDP growth is having significant and positive impact on leverage.
Frank & Goyal (2009)	USA	Data from 1950-2003 for US firms in Compustat database	GDP has significant positive influence on leverage.
Oztekin & Flannery (2012)	37 countries	Firms 15177 with 105568 firm year observations. data of 16 years from 1991-2006	GDP growth is found to be significantly negatively related with target leverage.
Kayo & Kimura (2011)	40 different countries	17,061 companies with 114788 firm year observations. Data has been used from 1997 through 2007	GDP growth is having insignificant negative relationship with leverage using HLM (Hierarchical Linear Modeling) in full sample.
Haron and Ibrahim (2012)	Malaysia	Data from 2000-2009 of 663 firms	GDP is negatively related with leverage and significant for two measures of leverage. Insignificant and positive are also found for one measure of leverage each.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Economic growth measured as annual percentage change in GDP is positively related for three out of measures of leverage. However significance is reported for only one measure of leverage.
Cho *et al.* (2014)	48 countries	Panel data with 151855 firm year observations from 1991-2000.	GDP growth has positive significant effect on for one measure and negative significant for other measure of leverage.

significant relationship of leverage with GDP which is in line with the argument of Myers (1977) that firms grow in good economic conditions and growing firms use less debt.

2.5 Determinants of the Speed of Adjustment towards Optimal Debt Ratio

Various researchers, in their empirical studies focusing on the adjustment speed towards target leverage ratios, have argued that adjustment speed is different across the firms, industries, and countries because of the differences in adjustment costs. Since the adjustment cost depends upon the profitability, size, growth, and the distance between actual and optimal leverage so the adjustment speed is affected by these factors (Mukherjee & Mahakud, 2010). Besides these, there are some other factors that are likely to affect the adjustment speed. The factors that are considered in this study are described below.

2.5.1 Distance between Observed and Optimal Debt

Drobetz and Wanzenried (2006) and Mukherjee and Mahakud (2010) argue that if the total cost of the changing capital structure mainly comprises of fixed cost, such as legal fees and investment banking fees, firms employing suboptimal debt levels will not frequently change or adjust to their target leverage ratios. The adjustment speed towards target is likely to be higher if the firm is at large distance from its target capital structure. Based on this argument speed of adjustment seems to be positively associated with the absolute distance between observed and target leverage. A positive coefficient of this variable shows that slow and frequent adjustment cost is higher than one time restructuring cost (Haas & Peeters, 2006).

There is a different stance that establishes the negative relationship between the adjustment speed and distance to optimal level. According to this stance firms that are not far away from their target can quickly adjust towards target without incurring transaction cost (Haron *et al.,* 2013). They can change dividends payout ratio to make adjustment rather than making transactions in external capital market. This argument is supported by Banerjee *et al*. (2004) and Drobetz and Wanzenried (2006). Negative relationship is reported by Banerjee *et al.* (2004) and Haron *et al.* (2013).

Empirical evidences of Haas and Peeters (2006), Drobetz *et al.* (2007), and Mukherjee and Mahakud (2010) find the positive significant relationship of this distance variable with adjustment speed supporting the argument of high cost of changing capital structure. Banerjee *et al.* (2004) and Haron *et al.* (2013) find the negative significant relationship of distance with adjustment speed suggesting quick adjustment if firms are not at large distance from the target. Lemma and Negash (2014), for nine African countries, also report the negative significant relationship of distance with adjustment speed for one measure of leverage. Table 2.13 reports the key findings of various studies regarding the relationship between distance variable and adjustment speed.

Table 2.13
Empirical Evidences of Relationship of Distance with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Banerjee *et al.* (2004)	UK and US	122 UK firms and 438 US firms from 1990-1996	Significant negative effect for distance with adjustment speed is reported for UK firms at market value leverage.
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Distance has positive significant relationship with speed of adjustment towards target debt ratio.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Distance has weak negative impact on adjustment speed.
Haas & Peeters (2006)	10 Central and Eastern European countries	1993-2001	Distance from target is statistically significant and has positive relationship with adjustment speed.
Drobetz *et al.* (2007)	Germany, France, Italy, and UK	706 firms data from 1982-2006	Distance from target is statistically significant and has positive relationship with adjustment speed.
Mukherjee and Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08	Significant positive relationship of distance, with both market and book based leverage, is reported.
Haron *et al.*(2013)	Malaysia	Panel data of 790 firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Significant negative relationship of Distance with adjustment speed is reported.
Lemma and Negash (2014)	Nine African countries	Data from 1999-2008 from OSIRIS database of Dijk	Distance from target has positive significant impact on adjustment speed for one measure and negative significant impact for other.

2.5.2 Size of the Firm

The cost of changing capital structures is substantially fixed and it is relatively small for large firms; so they may adjust quickly towards their target debt ratios (Mukherjee & Mahakud, 2010). Due to superior analysts' coverage large firms' information is readily available to the public and consequently they have superior access to debt and equity markets (Drobetz & Wanzenried, 2006). Based on these arguments it is expected that large firms can quickly adjust towards target; hence establishing positive relationship with adjustment speed. Based on the argument made by Nivorozhkin (2004), negative relationship can also be expected. According to Nivorozhkin (2004) argument, banks may have conservative lending policies and may avoid large lending exposure to the larger firms making it easier for smaller firms to get lending from the banks and adjust towards target more rapidly. Negative relationship of size with adjustment speed can also be established on the basis of another argument that cost of moving away from target may be smaller for larger firms as compared to smaller firms (Elsas & Florysiak, 2011); because large firms have less volatility in cash flows, which reduces the potential cost of distress (Flannery & Rangan, 2006). Flannery and Hankins (2007) argue that small potential distress cost makes the adjustment towards target less attractive; hence the adjustment speed is reduced for large firms.

Table 2.14 shows that the empirical studies of Banerjee *et al.*(2004), Drobetz *et al.* (2007), Haron *et al.* (2013), and others, establish the positive significant relationship with adjustment speed to target leverage supporting the argument of availability of information and lower cost of changing capital structure for large firms. Negative

Table 2.14
Empirical Evidences of Relationship of Size with Adjustment Speed

Author	Country	Sample (Period)	Key Findings
Banerjee *et al.*(2004)	UK and US	122 UK firms and 438 US firms from 1990-1996	Size is statistically significant and has positive relationship with adjustment speed.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Mixed results reported for the impact of size on adjustment speed.
Drobetz *et al.* (2007)	Germany, France, Italy, and UK	706 firms data from 1982-2006	Size is statistically significant and has positive relationship with adjustment speed.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08	Significant positive relationship of size with both measures of leverages is reported.
Oztekin & Flannery (2012)	37 countries	Data of 16 years from 1991-2006	Negative significant relationship of size is reported with adjustment speed.
Haron *et al.* (2013)	Malaysia	Panel data of 790 from 2000-2009 with 6531 firm year observations.	Significant positive relationship of size with adjustment speed is reported.
Wang (2013)	40 countries	30489 firms from 1994-2010	Relative firm size has positive significant relationship with adjustment speed.
Chipeta and Mbululu (2013)	South Africa	Data from 2000-2010 for 191 firms listed at Johannesburg Stock Exchange	Size is found to have negative significant impact on adjustment.
Lemma and Negash (2014)	Nine African countries	Data from 1999-2008 from OSIRIS database of Dijk	Size has positive significant impact on adjustment speed for one measure of leverage and negative significant impact for another measure of leverage.

significant relationship is reported by Oztekin and Flannery (2012) and Chipeta and Mbululu (2013) indicating that the cost of being away from target for large firms is smaller (Elsas & Florysiak, 2011) or smaller firms can easily borrow from banks (Nivorozhkin, 2004).

2.5.3 Growth

Firms having high growth opportunities may have several sources of financing and can frequently raise the capital to exploit growth opportunities. It becomes easier for growing firms to make capital structure changes by issuing the desired securities to adjust towards target. Low growth firms can't frequently make changes and will have to only swap debt against equity or equity against debt to adjust towards target (Mukherjee & Mahakud, 2010). In the existence of asymmetric information this can send a negative signal and decrease value of the firm (Drobetz & Wanzenried, 2006). But for the growing firms the presence of asymmetric information may not change firm value due to high growth opportunities' positive effect. Eriotis, Vasiliou, and Ventoura-Neokosmidi (2007) argue that growth firms' value vary, which shows the increased risk hence making it difficult to raise capital at favorable terms. This establishes the negative relationship with adjustment speed.

As given in Table 2.15 positive significant relationship of growth with adjustment speed is reported in the empirical studies of Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), Oztekin and Flannery (2012) and some others. Positive relationship of

Table 2.15

Empirical Evidences of Relationship of Growth with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative significant relationship of growth is reported with adjustment speed.
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Growth has significant positive impact on adjustment speed.
Drobetz *et al.* (2007)	Germany, France, Italy, and UK	706 firms' data from 1982-2006	Growth is statistically significant and has positive relationship with adjustment speed.
Mukherjee & Mahakud (2010)	India	Panel data of 891 firms from 1993-94 to 2007-08 has been taken.	Significant positive relationship of growth with adjustment speed using market leverage is reported.
Oztekin & Flannery (2012)	37 countries	Data of 16 years from 1991-2006	Positive significant relationship of growth is reported with adjustment speed.
Haron *et al.* (2013)	Malaysia	Panel data of 790 firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Negative insignificant impact of growth on adjustment speed is reported.
Chipeta and Mbululu (2013)	South Africa	191 firms listed Johannesburg Stock Exchange Data from 2000-2010	Growth has negative significant impact on speed of adjustment.
Lemma and Negash (2014)	Nine African countries	Data from 1999-2008 from OSIRIS database of Dijk	Growth has insignificant impact on adjustment speed using all measures of leverage.

growth with adjustment speed, in empirical studies, lends support to the argument that growing firms frequently raise capital and they choose that financing method which brings them closer to target. Heshmati (2001) and Chipeta and Mbululu (2013) report the negative significant relationship of growth with adjustment speed justifying the argument of high risk for growth firms.

2.5.4 Profitability

Profitability is likely to affect the adjustment speed and positive association can be expected. As per the argument made by Myers and Majluf (1984), the companies prefer internal source of financing over external and high profitability increases the availability of internal funds thus increasing the adjustment speed towards optimal. Flannery and Hankin (2007) state that free cash flows from profitability reduce the cost of external financing hence affecting the adjustment speed. Flannery and Hankins (2007) further argue that profitable firms enjoy flexibility in financing decisions and they may issue the securities at lower rates, hence reducing the cost of adjustment.

Haron *et al.* (2013), as shown in Table 2.16, indicate the positive significant relationship between profitability and adjustment speed towards target strengthening the argument of Myers and Majluf (1984). Against their expectations, Heshmati (2001) and Oztekin and Flannery (2012) report the negative significant impact of profitability on adjustment speed. Limited number of studies has used the profitability as the determinant of adjustment speed. This variable requires to be investigated further in the more empirical studies due to conflicting results.

Table 2.16

Empirical Evidences of Relationship of Profitability with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Heshmati (2001)	Sweden	Data of 2261 small Swedish firms from 1994-97	Negative significant relationship of profitability is reported with adjustment speed.
Oztekin & Flannery (2012)	37 countries	Data of 16 years from 1991-2006	Negative significant relationship of profitability is reported with adjustment speed.
Haron *et al.* (2013)	Malaysia	Panel data of 790 non financial firms listed in Bursa Malaysia from 2000-2009 with 6531 firm year observations.	Significant positive impact of profitability on adjustment speed is reported.
Lemma and Negash (2014)	Nine African countries	Data from 1999-2008 from OSIRIS database of Dijk	Profitability has positive significant impact on adjustment speed for both short term and total leverages.

2.5.5 GDP Growth Rate

Banerjee *et al.* (2004) states that besides the company specific factors, some economic factors such as interest rate, money supply, and economic conditions may also affect the adjustment speed towards optimal capital structure. It is expected that firms can easily move towards target debt ratios in good economic conditions than in economic downturns (Haas & Peeters, 2006). Drobetz and Wanzenried (2006), for Swiss firms, show that the adjustment speed depends upon the economic conditions. Frank and Goyal (2009) and Korajczyk and Levy (2003) argue that the adjustment cost towards target should be lower in good economic conditions. Cook and Tang (2010) argue that probability of incurring losses and making default are related to the state of economy. Since the high GDP growth is an indicator of good economic conditions the adjustment speed may be high. Chipeta and Mbululu (2013) state that in growing economy investments take place that necessitate the demand for external financing. Hence a change in capital structure can be expected. Clark *et al.* (2009) finds the significant relationship of the GDP growth rate with the speed of adjustment in subsample of developed countries. Wang (2013) used the macroeconomic conditions and market imperfections as proxy of the adjustment cost and reports significant positive relationship of GDP growth rate with speed of adjustment towards optimal debt ratio and securities issuance and repurchase activities.

Table 2.17 shows the results of some other empirical studies regarding the relationship of GDP growth rate with leverage. Almost all of the studies listed report the positive significant impact of GDP growth rate on adjustment speed towards target leverage.

Table 2.17

Empirical Evidences of Relationship of GDP with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Haas & Peeters (2006)	10 Central and Eastern European countries	1993-2001	GDP growth has positive significant relationship with adjustment speed in three countries and negative significant in one country.
Clark *et al.* (2009)	19 developing and 21 developed countries	Data of 26395 firms from 1990 to 2006	GDP growth has positive significant relationship with adjustment speed in developed countries.
Oztekin & Flannery (2012)	37 countries	Data of 16 years from 1991-2006	Positive significant relationship of GDP is reported with adjustment speed.
Wang (2013)	40 countries	30489 firms from 1994-2010	Positive significant relationship of GDP growth rate with adjustment speed is reported.
Chipeta & Mbululu (2013)	South Africa	Data from 2000-2010 Sample of 191 non financial firms listed at Johannesburg Stock Exchange	Positive significant relationship of GDP growth rate and adjustment speed is reported.

2.5.6 Tax Rate

In accordance with the trade-off theory, a positive relationship of the speed of adjustment with high tax rates is predicted (Clark *et al.,* 2009) because firms using sub optimal debt are tempted to make quick adjustment to take the benefit of debt tax shield. As argued by Oztekin and Flannery (2012) tax shield of debt increases the value of moving and maintaining the optimal debt ratios. Underleveraged firms are induced to move faster to their target to get benefit of tax shield. Very limited number of studies has used taxes as explanatory variable of adjustment speed.

As given in table 2.18, Clark *et al.* (2009) report effective tax rate as the significant determinant of the speed of adjustment towards optimal leverage ratio in a subsample of the firms with untapped tax benefits in developing countries. Oztekin (2013) also reports significant positive relationship of effective tax rates with speed of adjustment. These findings of positive relationship of tax rate with adjustment speed justify the argument that firms having untapped debt tax shield due to lower debt move quicker to target. Negative significant relationship of tax rates with adjustment speed towards target debt is reported by Oztekin and Flannery (2012).

Table 2.18

Empirical Evidences of Relationship of Tax Rate with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Clark *et al.* (2009)	19 developing and 21 developed countries	Data of 26395 firms from 1990 to 2006	Effective tax rate has significant positive impact on adjustment speed in developing countries.
Oztekin & Flannery (2012)	37 countries	Firms 15177 with 105568 firm year observations and data of 16 years from 1991-2006	Tax is found to be significantly negatively related with speed of adjustment.
Oztekin (2013)	37 countries	15177 firms from 37 countries with 101264 firm year observations. Data from 1991-2006	Tax has significant positive effect on speed of adjustment.
Lemma and Negash (2014)	Nine African countries	Data from 1999-2008 from OSIRIS database of Dijk	Tax rate has positive significant impact on adjustment speed.

2.5.7 Stock Market Development

Development of financial market is expected to affect the adjustment speed towards optimal debt because in developed markets the cost of raising external capital is reduced; hence reducing financial restructuring (recapitalization) cost (Lemma & Negash, 2014). Demirguc-Kunt and Maksimovic (1996) indicate that overall capital supply is increased in developing countries if development of one financial sector takes place and in developed countries changes in the composition of capital supply takes place. Clark *et al*. (2009) also reveal that the stock market development is an important factor affecting the adjustment speed towards optimal capital structure and has significant positive impact. Lemma and Negash (2014) report the negative significant impact of stock market size on adjustment speed for two measures of leverage and positive significant impact for one measure of leverage. Impact of stock market development on speed of adjustment need to be further investigated as limited number of empirical evidences is available regarding the relationship between these two.

2.5.8 Interest Rate

The market interest rate is also considered the factor affecting the adjustment speed towards target. The high prevailing interest rates may hinder the adjustment process towards target. Lower interest rates may stimulate the immediate adjustment towards target. Drobetz, Pensa, and Whole (2006), as cited in Drobetz *et al*. (2007), report that firms would like to issue debt when the interest rates are low. Thus a negative relationship of adjustment speed can be expected with the market interest rate.

Table 2.19

Empirical Evidences of Relationship of Interest with Adjustment Speed

Author	**Country**	**Sample (Period)**	**Key Findings**
Drobetz & Wanzenried (2006)	Switzerland	90 Swiss firms over the period of 1991-2000.	Short term interest has negative significant impact on adjustment speed for book measure of leverage.
Haas & Peeters (2006)	10 Central and Eastern European countries	1993-2001	Negative significant impact of money market interest rate on adjustment speed is reported in one country.
Drobetz *et al.* (2007)	Germany, France, Italy, and UK	706 firms data from 1982-2006	Short term interest rate significant and has negative relationship with adjustment speed.

Few studies, listed in Table 2.19, are found using interest rate as the determinant of adjustment speed towards target. All these studies of Drobetz and Wanzenried (2006), Haas and Peeters (2006), and Drobetz *et al.* (2007) find negative significant relationship of interest rates with adjustment speed justifying the argument that lower interest rates stimulate to make faster adjustment towards target.

2.6 Chapter Summary

This chapter starts with the discussion of capital markets of Pakistan. Both equity and debt capital markets have been discussed. Further this chapter reviews the importance of optimal capital structure, which is the dependent variable of this study, and discusses its relationship with its determinants, the independent variables. Every variable has been discussed in terms of its relationship with the dependent variable and has been supported with empirical findings. Empirical evidences from different countries have been given. This chapter further identifies the relationship of speed of adjustment towards target leverage, which is another dependent variable, with its determinants the independent variables. Underlying theories of this study are also presented.

Third chapter discusses the research methodology adopted for this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter explains the research methodology used in this study. First section discusses the research design that includes research framework, estimation methodology, sampling technique, sampling framework and size, data sources and data analysis techniques. This section is followed by the second section of hypotheses development. Third section of the chapter describes the methods of the measurement of the variables used.

3.1 Research Design

This study is quantitative in nature as it is based on the theories developed over time through empirical evidences. The variables considered in this study have already been used for the empirical studies conducted in various countries' context but the findings and significance are inconsistent. The set of variables used in this study has not been exactly used previously. For Pakistan the capital structure studies, including such a comprehensive set of variables, affecting both optimal debt and speed of adjustment towards optimal debt, as per researcher's knowledge, are lacking. This study uses the secondary sources of data. Following section discusses the research framework, model development (specification), sampling framework and sampling technique, data collection sources, estimation methodology, hypothesis development, and measurement of the variables used in this study.

3.1.1 Research Framework

As discussed in the literature review chapter, firms' optimal capital structure is affected by the company specific factors, industry characteristics, and the country specific characteristics. Empirical studies establish that speed of adjustment towards optimal debt is also affected by different variable. This study uses the following framework to study the capital structure of non financial firms in Pakistan. The framework in Figure 3.1 shows that the optimal debt ratio of the firms, in this study, is considered to be dependent upon the 12 different types of variables that can be categorized as company specific, industry, and country specific. Figure 3.2 shows that in this study, the speed of adjustment towards optimal debt is considered to be dependent upon 8 different variables that can be categorized as company specific and country specific.

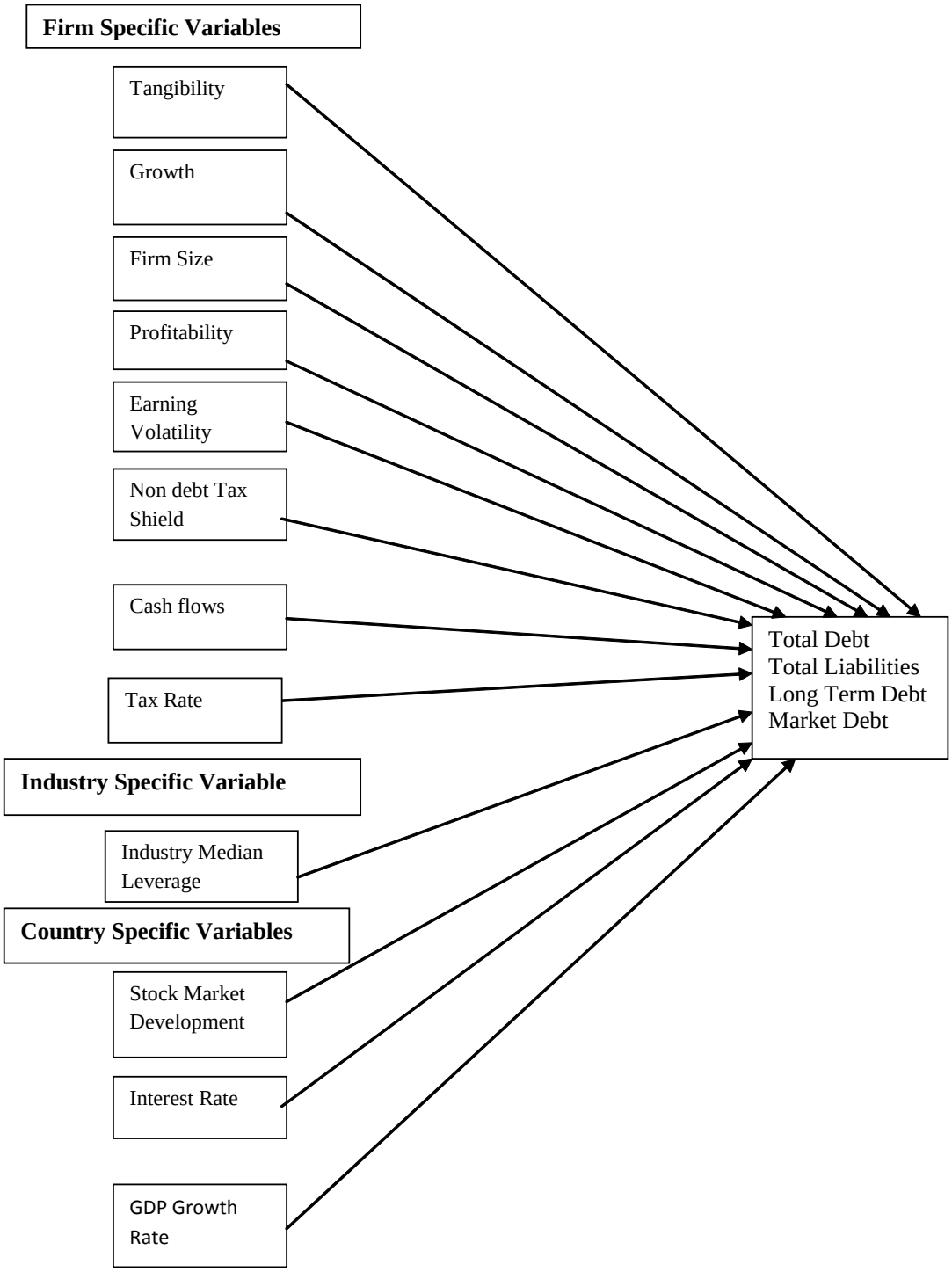

Figure 3.1

Factors Affecting Optimal Capital Structure

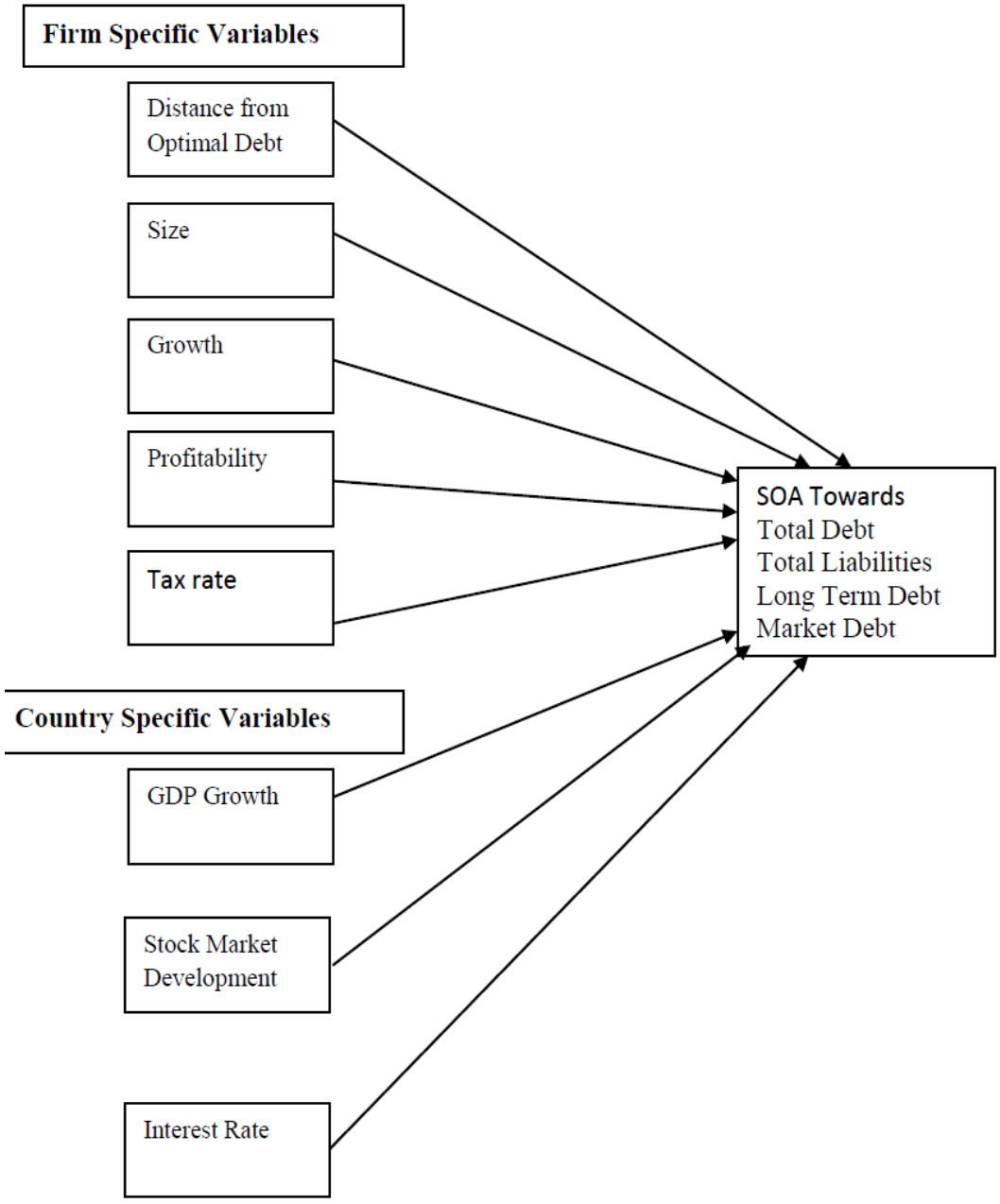

Figure 3.2

Factors Affecting Speed of Adjustment towards Optimal Debt Ratio

3.1.2 Model Development (Specification)

This study is using the dynamic panel data estimation model to examine the influence of adjustment cost and determine the existence of optimal debt for Pakistani firms. Following DeMiguel and Pindado (2001), Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), and Haron *et al.* (2013), this study uses the partial adjustment model as it considers the target debt ratio (TD) to be the linear function of a set of explanatory factors used in previous studies of capital structure. It is expressed in equation (1) below

$$\mathrm{TD}_{\mathrm{it}} = f\left(V_{it}, V_i, V_t\right) \qquad (1)$$

Where $\mathrm{TD}_{\mathrm{it}}$ is the target debt ratio of firm *i* at time *t*, V_{it} is the vector of firm and time variant explanatory factors of target debt ratio. V_{i} and V_{t} are unobservable firm, country, and time specific effects that are common to all firms and may change overtime.

This relationship can also be shown as:

$$\mathrm{TD}_{\mathrm{it}} = \sum_{i=1}^{n} \beta_k V_{kit} + u_{it} \qquad (2)$$

In the absence of adjustment cost and other market imperfections firms would quickly respond and adjust completely to target debt due to change in explanatory variables. So firms should always be at target debt and its observed debt ($\mathrm{OD}_{\mathrm{it}}$) should be equal to target debt ($\mathrm{TD}_{\mathrm{it}}$) which means that $\mathrm{TD}_{\mathrm{it}} = \mathrm{OD}_{\mathrm{it}}$. This suggests that the change in observed debt from the last to current period should exactly be equal to the change desired for the firms to be at target at time t. This means that $OD_{it} - OD_{it-1} = TD_{it} - OD_{it-1}$. Practically, firms are not likely to completely adjust its actual debt to target debt due to

adjustment cost. Simply stating firms will partially adjust to its target debt but not fully and their observed debt will not be equal to target debt. This partial adjustment model can be represented in equation (3) through equation (7) below.

$$OD_{it} - OD_{it-1} = \delta_{it}(TD_{it} - OD_{it-1}) \qquad (3)$$

$$OD_{it} = OD_{it-1} + \delta_{it}(TD_{it} - OD_{it-1}) \qquad (4)$$

$$OD_{it} = OD_{it-1} + \delta_{it}TD_{it} - \delta_{it}OD_{it-1} \qquad (5)$$

$$OD_{it} = OD_{it-1} - \delta_{it}OD_{it-1} + \delta_{it}TD_{it} \qquad (6)$$

$$OD_{it} = (1-\delta_{it})OD_{it-1} + \delta_{it}\left(\sum_{i=1}^{n}\beta_k V_{kit} + u_{it}\right) \qquad (7)$$

Since target debt (TD_{it}), in this study, is considered to be dependent upon firm specific factors such as profitability (*pro*), tangibility (*tan*), growth (*gro*), size (*siz),* earning volatility (*erv*), cash (*csh*), tax rate (*txr*), and non-debt tax shield (*ndt*), and industry specific factor such as industry median leverage (*iml*), and country specific factors such as GDP growth rate (*gdp*), interest rate (*inr*), and stock market development (*smd*), so equation (7) can be expanded as:

$$\begin{aligned} OD_{it} &= (1-\delta_{it})OD_{it-1} + \delta_{it}\beta_1 pro_{it} + \delta_{it}\beta_2 \tan_{it} + \delta_{it}\beta_3 gro_{it} + \delta_{it}\beta_4 siz_{it} \\ &+\delta_{it}\beta_5 erv_{it} + \delta_{it}\beta_6 csh_{it} + \delta_{it}\beta_7 txr_{it} + \delta_{it}\beta_8 ndt_{it} + \delta_{it}\beta_9 iml_{it} + \delta_{it}\beta_{10} gdp_t + \\ &\delta_{it}\beta_{11} inr_t + \delta_{it}\beta_{12} smd_t + u_{it} \end{aligned} \qquad (8)$$

Replacing (1- δ_{it}) with λ_0 and $\delta it\ \beta_k$ with λ_k, equation (8) can be re-written as:

$$\begin{aligned} OD_{it} &= \lambda_0 OD_{it-1} + \lambda_1 pro_{it} + \lambda_2 \tan_{it} + \lambda_3 gro_{it} + \lambda_4 siz_{it} + \lambda_5 erv_{it} + \\ &\lambda_6 csh_{it} + \lambda_7 txr_{it} + \lambda_8 ndt_{it} + \lambda_9 iml_{it} + \lambda_{10} gdp_t + \lambda_{11} inr_t + \lambda_{12} smd_t + u_{it} \end{aligned} \qquad (9)$$

The coefficient $\delta_{it,}$ in equation (8), refers to adjustment coefficient or adjustment speed. It shows the amount of required adjustment between two subsequent periods or rate of convergence of observed debt (OD_{it}) to its target debt (TD). The impact of the adjustment costs is shown by the limitation that $|\delta_{it}| < 1$which is a condition that $OD_{it} \rightarrow TD$ as $t \rightarrow \infty$. Equation (3) suggests the degree of convergence depending on value of the parameter of adjustment.

If the value of δ_{it} is 1, it means that the complete adjustment is made within 1 period and firm at time *t* is at its optimal debt level. The value of δ_{it} can vary across the firms and even over the time for the same firm. The firm is said to be always at target if δ_{it} value is 1 for all periods. If the value of δ_{it} is less than 1, the adjustment from the last period (t-1) to this period (t) is less than the adjustment required to be at target debt. If the value of δ_{it} is greater than 1, firm is said to over adjust and makes more adjustment than required to reach at target debt level and will not be still at target. Since δ_{it} shows the amount of adjustment, a higher value of δ_{it} reflects the higher adjustment speed towards target debt. Following Ozkan (2001), Mukherjee and Mahakud (2010), and Haron *et al.* (2013), equation (9), which is dynamic model, is estimated using Arellano and Bond (1991) difference Generalized Method of Moments (GMM) to estimate the adjustment speed and identifying the factors affecting the target debt. In this model the target debt ratio, to which the firms make adjustment, is not determined externally rather it is considered in the model as the linear function of the factors determining optimal debt as given in equation (2).

The model is extended and it endogenizes the adjustment speed towards optimal debt. To explain the factors influencing the adjustment speed, it is assumed that δ_{it} changes over time and is a linear function of some predetermined explanatory factors and a constant term as given in equation (10). A determinant variable of the adjustment speed labeled as X_{it} is a firm related, country or country's macroeconomic variable.

$$\delta_{it} = \alpha_0 + \alpha_k X_{it} \qquad (10)$$

X_{it} , in equation (10), has both cross sectional and time series dimensions when firm related factors of the speed of adjustment are used. But when the macroeconomic and other country related factors are used as the determinants of adjustment speed, X_{it} is not a firm related factor therefore the subscript *it* will be replaced with only *t*.

Now replacing the values in equation (3) from equation (2) and (10) and rewriting it will result into the following model.

$$OD_{it} = (1-\delta_{it})OD_{it-1} + \delta_{it}TD_{it} + u_{it}$$

$$OD_{it} = \left(1-\alpha_0-\alpha_k X_{it}\right)OD_{it-1} + \left(\alpha_0+\alpha_k X_{it}\right)\left(\sum_{i=1}^{n}\beta_k V_{kit} + u_{it}\right) \qquad (11)$$

Where u_{it} is statistical error with constant variance and zero mean. Simplifying equation (11) and keeping in mind that all estimations will be made using panel data, we get following model that is subject to our estimation.

$$OD_{it} = \left(1-\alpha_0\right)OD_{it-1} - \alpha_k X_{it} OD_{it-1} + \alpha_0 \sum_{i=1}^{n} B_k V_{kit} + \alpha_k \sum_{i=1}^{n} X_{it} B_k V_{kit} + u_{it} \qquad (12)$$

Expanding the equation (12) by plugging in the values of X_{it} and V_{kit} we get

$$
\begin{aligned}
&OD_{it} = (1-\alpha_0)OD_{it-1} - \alpha_1 gro_{it}OD_{it-1} - \alpha_2 siz_{it}OD_{it-1} - \alpha_3 pro_{it}OD_{it-1} - \alpha_4 tax_{it}OD_{it-1} \\
&-\alpha_5 ds_{it}OD_{it-1} - \alpha_6 gdp_t OD_{it-1} - \alpha_7 smd_t OD_{it-1} - \alpha_8 inr_t OD_{it-1} + \alpha_0\beta_1 pro_{it} + \alpha_0\beta_2 \tan_{it} \\
&+\alpha_0\beta_3 gro_{it} + \alpha_0\beta_4 tax_{it} + \alpha_0\beta_5 erv_{it} + \alpha_0\beta_6 ndt_{it} + \alpha_0\beta_7 csh_{it} + \alpha_0\beta_8 siz_{it} + \alpha_0\beta_9 il_{it} \\
&+\alpha_0\beta_{10} gdp_t + \alpha_0\beta_{11} inr_t + \alpha_0\beta_{12} smd_t + \alpha_k\beta_k \left(gro_{it} + siz_{it} + pro_{it} + tax_{it} + ds_{it} + gdp_t + inr_t + smd_t \right) \\
&\left(pro_{it} + \tan_{it} + gro_{it} + tax_{it} + erv_{it} + ndt_{it} + csh_{it} + siz_{it} + il_{it} + gdp_t + inr_t + smd_t \right)
\end{aligned}
\tag{13}
$$

Further simplifying equation (13) we get

$$
\begin{aligned}
&OD_{it} = (1-\alpha_0)OD_{it-1} - \alpha_1 gro_{it}OD_{it-1} - \alpha_2 siz_{it}OD_{it-1} - \alpha_3 pro_{it}OD_{it-1} - \alpha_4 tax_{it}OD_{it-1} \\
&-\alpha_5 ds_{it}OD_{it-1} - \alpha_6 gdp_t OD_{it-1} - \alpha_7 smd_t OD_{it-1} - \alpha_8 inr_t OD_{it-1} + \alpha_0\beta_1 pro_{it} + \alpha_0\beta_2 \tan_{it} \\
&+\alpha_0\beta_3 gro_{it} + \alpha_0\beta_4 tax_{it} + \alpha_0\beta_5 erv_{it} + \alpha_0\beta_6 ndt_{it} + \alpha_0\beta_7 csh_{it} + \alpha_0\beta_8 siz_{it} + \alpha_0\beta_9 iml_{it} + \\
&\alpha_0\beta_{10} gdp_t + \alpha_0\beta_{11} inr_t + \alpha_0\beta_{12} smd_t + \alpha_1\beta_1 gro_{it} pro_{it} + \alpha_1\beta_2 gro_{it} \tan_{it} + \alpha_1\beta_3 gro_{it} gro_{it} \\
&+\alpha_1\beta_4 gro_{it} tax_{it} + \alpha_1\beta_5 gro_{it} erv_{it} + \alpha_1\beta_6 gro_{it} ndt_{it} + \alpha_1\beta_7 gro_{it} csh_{it} + \alpha_1\beta_8 gro_{it} siz_{it} + \\
&\alpha_1\beta_9 gro_{it} iml_{it} + \alpha_1\beta_{10} gro_{it} gdp_t + \alpha_1\beta_{11} gro_{it} inr_t + \alpha_1\beta_{12} gro_{it} smd_t + \alpha_2\beta_1 siz_{it} pro_{it} + \\
&\alpha_2\beta_2 siz_{it} \tan_{it} + \alpha_2\beta_3 siz_{it} gro_{it} + \alpha_2\beta_4 siz_{it} tax_{it} + \alpha_2\beta_5 siz_{it} erv_{it} + \alpha_2\beta_6 siz_{it} ndt_{it} + \\
&\alpha_2\beta_7 siz_{it} csh_{it} + \alpha_2\beta_8 siz_{it} siz_{it} + \alpha_2\beta_9 siz_{it} iml_{it} + \alpha_2\beta_{10} siz_{it} gdp_t + \alpha_2\beta_{11} siz_{it} inr_t + \\
&\alpha_2\beta_{12} siz_{it} smd_t + \alpha_3\beta_1 pro_{it} pro_{it} + \alpha_3\beta_2 pro_{it} \tan_{it} + \alpha_3\beta_3 pro_{it} gro_{it} + \alpha_3\beta_4 pro_{it} tax_{it} + \\
&\alpha_3\beta_5 pro_{it} erv_{it} + \alpha_3\beta_6 pro_{it} ndt_{it} + \alpha_3\beta_7 pro_{it} csh_{it} + \alpha_3\beta_8 pro_{it} siz_{it} + \alpha_3\beta_9 pro_{it} iml_{it} + \\
&\alpha_3\beta_{10} pro_{it} gdp_t + \alpha_3\beta_{11} pro_{it} inr_t + \alpha_3\beta_{12} pro_{it} smd_t + \alpha_4\beta_1 tax_{it} pro_{it} + \alpha_4\beta_2 tax_{it} \tan_{it} + \\
&\alpha_4\beta_3 tax_{it} gro_{it} + \alpha_4\beta_4 tax_{it} tax_{it} + \alpha_4\beta_5 tax_{it} erv_{it} + \alpha_4\beta_6 tax_{it} ndt_{it} + \alpha_4\beta_7 tax_{it} csh_{it} + \\
&\alpha_4\beta_8 tax_{it} siz_{it} + \alpha_4\beta_9 tax_{it} iml_{it} + \alpha_4\beta_{10} tax_{it} gdp_t + \alpha_4\beta_{11} tax_{it} inr_t + \alpha_4\beta_{12} tax_{it} smd_t + \\
&\alpha_5\beta_1 ds_{it} pro_{it} + \alpha_5\beta_2 ds_{it} \tan_{it} + \alpha_5\beta_3 ds_{it} gro_{it} + \alpha_5\beta_4 ds_{it} tax_{it} + \alpha_5\beta_5 ds_{it} erv_{it} + \alpha_5\beta_6 ds_{it} ndt_{it} \\
&+\alpha_5\beta_7 ds_{it} csh_{it} + \alpha_5\beta_8 ds_{it} siz_{it} + \alpha_5\beta_9 ds_{it} iml_{it} + \alpha_5\beta_{10} ds_{it} gdp_t + \alpha_5\beta_{11} ds_{it} inr_t + \alpha_5\beta_{12} ds_{it} smd_t \\
&+\alpha_6\beta_1 gdp_t pro_{it} + \alpha_6\beta_2 gdp_t \tan_{it} + \alpha_6\beta_3 gdp_t gro_{it} + \alpha_6\beta_4 gdp_t tax_{it} + \alpha_6\beta_5 gdp_t erv_{it} + \\
&\alpha_6\beta_6 gdp_t ndt_{it} + \alpha_6\beta_7 gdp_t csh_{it} + \alpha_6\beta_8 gdp_t siz_{it} + \alpha_6\beta_9 gdp_t iml_{it} + \alpha_6\beta_{10} gdp_t gdp_t + \\
&\alpha_6\beta_{11} gdp_t inr_t + \alpha_6\beta_{12} gdp_t smd_t + \alpha_7\beta_1 inr_t pro_{it} + \alpha_7\beta_2 inr_t \tan_{it} + \alpha_7\beta_3 inr_t gro_{it} + \\
&\alpha_7\beta_4 inr_t tax_{it} + \alpha_7\beta_5 inr_t erv_{it} + \alpha_7\beta_6 inr_t ndt_{it} + \alpha_7\beta_7 inr_t csh_{it} + \alpha_7\beta_8 inr_t siz_{it} + \alpha_7\beta_9 inr_t iml_{it} \\
&+\alpha_7\beta_{10} inr_t gdp_t + \alpha_7\beta_{11} inr_t inr_t + \alpha_7\beta_{12} inr_t smd_t + \alpha_8\beta_1 smd_t pro_{it} + \alpha_8\beta_2 smd_t \tan_{it} + \\
&\alpha_8\beta_3 smd_t gro_{it} + \alpha_8\beta_4 smd_t tax_{it} + \alpha_8\beta_5 smd_t erv_{it} + \alpha_8\beta_6 smd_t ndt_{it} + \alpha_8\beta_7 smd_t csh_{it} \\
&+\alpha_8\beta_8 smd_t siz_{it} + \alpha_8\beta_9 smd_t iml_{it} + \alpha_8\beta_{10} smd_t gdp_t + \alpha_8\beta_{11} smd_t inr_t + \alpha_8\beta_{12} smd_t smd_t
\end{aligned}
\tag{14}
$$

Equation (14) is estimated in first differences using GMM, whereby the levels of all right-hand side variables at the second lag are used as instruments. In equation (14) the

concern is mainly α_k parameter which is the coefficient on interaction term between explanatory variable of speed of adjustment X_{it} and lagged debt variable $ODit_{-1.}$ Earlier studies of the determinants of adjustment speed by Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), Ayber-Arias *et al*. (2012) and Haron *et al*. (2013) also interpret the coefficients of these interaction terms as the determinants of the adjustment speed.

Following Haron *et al.* (2013) and Haron (2014), the equation (14) is partially estimated up to α_k terms (the interaction terms between lagged leverage and determinants of the adjustment speed) for interpreting the coefficients of the factors affecting the adjustment speed. The similar approach seems to be adopted in the studies of Mukherjee and Mahakud (2010), Chipeta and Mbululu (2013), and Lemma and Negash (2014). Partial estimation of the model is justified by the following two facts. First, the $\alpha_k \beta_k$ appearing in $\alpha_k \sum_{i=1}^{n} X_{it} B_k V_{kit}$ in equation, do not clearly contribute in explaining the variations and are difficult to interpret (Aybar- Arias, Casino-Martínez, and López-Gracia, 2012). Second, since Arellano and Bond (1991) difference GMM is used to estimate the model, it takes instruments obtained from orthogonality conditions that exist between variables' lagged values and the disturbances. The estimation of the full model increases the number of variables; hence the number of instruments and it becomes much higher than the number of cross sections (143 firms). Roodman (2009) states the rule of thumb, regarding the number of instruments used in GMM, that the number of instruments should be less than

or equal to the number of cross sections (firms). Increased number of instruments weakens the instruments validity test (Mileva, 2007).

3.1.3 Sampling Framework and Sampling Technique

The sampling framework for this study is the non financial corporations, listed on Karachi Stock Exchange (KSE) of Pakistan. Following Ozkan (2001), DeMiguel and Pindado (2001), Gaud *et al.* (2005), Drobetz and Wanzenried (2006), Clark *et al.* (2009), Chipeta and Mbululu (2013), and Haron *et al.* (2013), only the non financial companies are considered in this study. Financial companies such as banks, insurance, investment firms and other financial companies are excluded, because their capital structure is regulated (Lemma & Negash, 2014). The structure of the financial statements of the firms in financial industry is also different from the non financial firms (Chakraborty, 2010).

The total number of non financial firms (population) in KSE Pakistan is 456[9]. Since the data is extracted from Thomson Reuters' database Datastream, it contains the financial data of 271 firms (including both financial and non financial firms) listed at KSE Pakistan. The non financial firms are excluded. Following Deesomsak *et al.* (2009) and Haron *et al.* (2013) the non financial firms that are having missing data for last three years have been dropped because the second lag of the variables is used as the instrument. The firm, industry, and country level data of 10 years from 2003-2012 has been taken. Many studies of capital structure such as Gaud *et al*. (2005), Gracia and Mira (2008), and Haron *et al.* (2013) have also used the 10 years' data. The final sample

[9] Manually compiled on October 18, 2013 from www.kse.com.pk

comprises of 143 non financial firms with 1190 firm year observations. This suggests that the firms in the sample on average have 8.32 years' data. This constitutes the unbalanced panel data. The dataset is unbalanced panel dataset because we do not have the required data for all firms, all years, and all variables. Unbalanced panel data does not create any conceptual problems except its handling from computer point of view (Asteriou & Hall, 2007).

3.1.4 Data Sources

The main required data for firm specific variables are available in the firms' financial reports such as income statement, balance sheet, and statement of cash flows. All this financial data is available in Thomson Reuters' financial database Datastream. To ensure the consistency, Datastream is used as the data source for firm specific variables. Datastream is widely used database in the studies of the capital structure. Some of them are Ozkan (2001), DeMiguel and Pindado (2001), Drobetz *et al.* (2007), Clark *et al.* (2009), and Haron *et al.* (2013). Datastream database has both accounting data of the firms and their market value of equity. For industry classifications, we also use the classification system given in Datastream. For country specific variables (macroeconomic variables) the World Bank's World Development Indictors (WDIs) has been used.

The data collected for this study is both the cross-section and the time series, called a panel data, as it is having the data of all considered variables for all sampled firms of Pakistan from 2003-2012. The panel data is supposed to be superior to the cross-section

data because of the large number of observations and higher degrees of freedom. Use of the panel data decreases the multicollinearity problem and provides more efficient estimates (Asteriou & Hall, 2007). Many of the empirical studies on the issue of dynamic capital structure such as Ozkan (2001), Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), and Haron *et al.* (2013) use the panel data.

3.1.5 Estimation Methodology (Difference Generalized Method of Moments)

Different empirical studies have used different techniques to estimate the partial adjustment model given in equation (9) for estimating adjustment speed and the determinants of optimal debt and equation (14) and for identifying factors affecting adjustment speed. Ordinary least square (OLS) and fixed effect regression have been used by Shyam-Sunder and Myers (1991) and Flannery and Rangan (2006) respectively. OLS is likely to be biased as the lagged dependent variable (OD_{it-1}) is present on the right hand side of both models (equation 9 and equation 14). Since the leverage is also the function of the firm fixed effects, u_i, so the lagged dependent variable will be correlated with error tem; hence the coefficient of the lagged dependent variable will be overestimated and speed will be underestimated in OLS (Xu, 2007; Drobetz *et al*., 2007).

Similarly, fixed effect estimation is also biased as it uses the within firm transformation (deviation of the observations from their individual cross section means) to eliminate the effects of the individual cross sections. Xu (2007) states that even though the transformation removes the firm fixed effect but it gives rise to the correlation between

the transformed dependent variable and the transformed error term. Hence, the coefficient of the lagged dependent variable (leverage), in fixed effect estimation, becomes seriously biased downwards and speed towards target leverage will be overestimated (Drobetz *et al.,* 2014).

Given these biases in use of OLS and fixed effect regression, this study, in line with the suggestions of Arellano and Bond (1991), uses the Difference Generalized Method of Moments (GMM) to estimate the dynamic model. Difference GMM estimator is designed for analyzing the panel data models in which the dependent variable is influenced by its past values (Mileva, 2007). It is proved by Arellano and Bond (1991) that the consistent estimates of the parameters are provided by GMM by using the instruments obtained from orthogonality conditions that exist between variables' lagged values and the disturbances. The model of this study represented as equation (9) and (14) also contain the lagged dependent variable (OD_{it-1}) as the explanatory variable. Roodman (2009) further supports the use of the difference GMM when there are entity fixed effects in error terms. Flannery and Rangan (2006), Lemmon *et al.* (2008), and Chang and Dasgupta (2011) empirically show that empirical studies ignoring the fixed effects are mis-specified because the majority of variation in capital structures is explained by firm specific factors.

Furthermore, Roodman (2009) also supports the use of GMM when the panel data has short time periods (T) and the large number of cross-sections/firms (N). Our panel data comprises of 143 firms and 10 years' data; hence the use of difference GMM is

supported. Roodman (2009) also supports the use of the difference GMM when some of the regressors may be endogenous and some explanatory variables may be predetermined and may not be strictly exogenous. To avoid the problems of endogeneity, an instrumental variable approach is used. Other instrumental variable techniques require the determination of external instruments to be used. However GMM uses the lagged values of the explanatory variables as the instruments. Difference GMM avoids the problems of entity fixed effects and serial correlation in panel data by taking the differenced form of the model. Many recent studies of the dynamic capital structure such as Drobetz and Wanzenried (2007), Mukherjee and Mahakud (2010), Haron *et al.* (2013), and Haron (2014) use difference GMM as the estimation technique. Flannery and Hankins (2013), report that out of the established estimation techniques of dynamic panel model the GMM appears to perform better.

This study uses three standard diagnostic tests to identify the problems that might arise from the use of GMM estimation. F-test, Hansen J- Statistic, and AR2 are used to test the joint significance of the coefficients, validity of instruments, and autocorrelation of the residuals respectively. The null hypothesis of F-test is that all the coefficients of the determinants of target debt are equal to zero. A smaller p-value is required for this test. Hansen J-Statistic is used to test the validity of the instruments used. The null hypothesis of this test is that the instruments used are exogenous. Hence a large p-value is required. Arellano and Bond second autocorrelation test (AR2) detects the autocorrelation at level 2. The null hypothesis for this test is that the error terms are not serially correlated at level 2. The higher p-value for AR2 test is required to accept the null hypothesis.

The data is pooled together to have panel data where all firm specific, industry, and country variables are considered. Asteriou and Hall (2007) describe that pooled data can provide much better estimates and the problem of omitted variables can be avoided if the data is pooled. Initially the descriptive statistics is used to analyze the variables and make comparisons. In descriptive analysis the mean, minimum, maximum, and standard deviation of the all variables of the sample are calculated. After the descriptive statistics, the model (equation 9) is estimated for pooled data to estimate the adjustment speed and to understand the factors influencing the optimal leverage using difference GMM. Model given as equation (14) is estimated to identify the factors affecting the adjustment speed towards target debt using difference GMM. Models are estimated using Generalized Method of Moments (GMM) to account for the heteroskedasticity and serial correlation of residuals.

Additionally, Pearson correlation coefficients for the all possible pairs of the variables are also estimated and reported in correlation matrix form to understand how do the variables affect each other. This matrix also helps us to understand the issue of collinearity between independent variables by analyzing the relationship between independent variables. To further ensure the non existence of multicollinearity in the data, variance inflating factor (VIF) is also calculated and reported in chapter 4. The desirable value of VIF is less than 10. As stated by the Gujarati (2004), the rule of thumb is that if VIF is more than 10 the variables are said to be highly collinear.

3.2 Hypotheses Development

This section discusses the hypotheses development process based on the theories and several empirical evidences relevant to the capital structure decisions. The hypotheses are presented variable wise. Hypotheses relevant to the determinants of the optimal leverage are discussed first, followed by the hypothesis regarding the factors influencing the speed of adjustment.

3.2.1 Adjustment Speed

The coefficient of lagged dependent variable (OD_{it-1}) is interpreted for the existence of dynamic capital structure and it provides the estimate of adjustment speed. Xu (2007) states that the low positive coefficient (high adjustment speed) of OD_{it-1} in equation (9), supports the presence of target capital structure and confirms that firms strive to diverge to it. The empirical studies such as Lemma and Negash (2014), Haron *et al.* (2013), Mukherjee and Mahakud (2010), Banerjee *et al.* (2004), and Ozkan (2001) report the positive coefficient of lagged dependent variable (OD_{it-1}) and confirm the existence of target capital structure in different countries.

Based on these findings from the empirical studies of different countries it is hypothesized for this study for Pakistan as:

H1: The coefficient of lagged dependent variable (OD_{it-1}) is positive and firms diverge towards target capital structure.

3.2.2 Tangibility

If a firm becomes bankrupt its tangible assets are likely to have more value in liquidation (Antoniou *et al.,* 2008). Any firms' intangible assets are likely to lose value in bankruptcy (De Jong *et al.,* 2008). The lenders may demand lower risk premium from a firm having high ratio of fixed assets because of the improved repayment assurance. Firms can use their tangible assets as the collateral and may issue secured debt. Secured debt's cost is lower than unsecured debt. Collateral also hinders the asset substitution so agency cost is also reduced. These arguments establish the positive relationship between optimal debt and fixed assets. Drobetz and Wanzenried (2006) and Flannery and Rangan (2006) confirm the positive relationship of the firms' tangibility with optimal debt ratio.

On the other hand firms having less amount of tangible assets may use more debt voluntarily to avoid excessive use of perquisites because of the increased monitoring cost. In line with this argument negative relationship of tangibility and debt (Drobetz & Wanzenried 2006) can be established. Mukherjee and Mahakud (2010) report negative relationship of tangibility with leverage.

On the basis of these arguments and findings of the studies like Rajan and Zingales (1995), Antoniou *et al*. (2008), Drobetz and Wanzenried (2006), Flannery and Rangan (2006), Mukherjee and Mahakud (2010), and Haron *et al.* (2013) our hypothesis regarding the tangibility is:

H2: Tangibility has a relationship with optimal leverage.

3.2.3 Growth

According to trade-off theory, for a high growth firm financial distress cost increases hence forcing managers to use less leverage in capital structure. Secondly, if information asymmetries persist and overvaluation of stock leads higher expected growth, the firms are likely to use equity capital rather than debt. These two reasons guide us to expect inverse relationship of growth with use of debt (Antoniou *et al.*, 2008). Agency theory also suggests the negative relationship between growth and debt based on the argument that agency conflicts arise from asset substitution and under investment; hence to minimize this conflict firms can use less debt (De Jong *et al.*, 2008).

For growing firm, internal funds may not be enough to meet the capital requirements of value adding projects. The firms may look for external financing. So pecking order theory predicts a positive relationship of firm's growth with use of the debt. The role of growth opportunities in determining the level of debt may be different in various countries due to disclosure practices, orientation of economy (bank based or market based), and lender-borrower relations. Ameer (2013), using OLS method, finds the positive relationship of growth with leverage. Haron *et al.* (2013) for one measure of leverage also report significant positive relationship of growth with leverage.

Based on the trade-off theory, pecking order theory, asymmetric information and findings of the empirical studies of Rajan and Zingales (1995), De Jong and Veld (2001), Antoniou *et al. (*2008), Drobetz and Wanzenried (2006), Flannery and Rangan (2006),

Drobetz and Fix (2005), Ameer (2013), and Fan *et al.* (2012) our hypothesis regarding the growth is:

H3: Growth opportunities have a relationship with optimal leverage.

3.2.4 Size of the Firm

It is generally assumed that the probability of being bankrupt for large firms is low so such firms can use more leverage to maximize the debt tax shield than small firms (Frank & Goyal, 2009). As per the argument of Titman and Wessels (1988) since the large firms are expected to be more diversified, their chances of failure are low, and they can have easy access to credit market, so they can use more debt. Myers and Majluf (1984), in their pecking order theory, predict the negative relationship of the size with optimal leverage based on the argument that asymmetric information problem may be low for the large firms, hence they can issue equity.

Corresponding to this argument, the trade-off perspective, and the findings of the studies of Rajan and Zingales (1995), Antoniou *et al.* (2008), Flannery and Rangan (2006), Mao (2003), Michaelas, Chittenden and Poutziouris (1999), Drobetz and Wanzenried (2006), and Mukherjee and Mahakud (2010) our hypothesis regarding the size is:

H4: Firms' size has a relationship with optimal leverage

3.2.5 Profitability

Theories of free cash flows and pecking order suggest that the firms' financing mix is affected by the profitability (Antoniou *et al.,* 2008). According to pecking order theory, retained earnings are preferred by the firms to finance new investment. After the retained earnings are exhausted, the firms may use debt (De Jong *et al.*, 2008). As the amount of retained earnings is based on the level of profits, hence negative relationship is established. This negative relationship is confirmed in many studies like Rajan and Zingales (1995), De Jong and Veld (2001), Antoniou *et al*. (2008), Flannery and Rangan (2006), Drobetz and Wanzenried (2006), and Mukherjee and Mahakud (2010).

The theory of the free cash flow was developed on the basis of empirical evidences provided by Jensen (1986). In this study it was shown that higher the free cash flows higher will be the agency cost. The use of debt in financing mix of a firm makes managers financially disciplined and they do not pursue their personal objectives, and make efficient investment decisions, because failure to meet interest obligation may lead to bankruptcy (Antoniou *et al.,* 2008). Since the level of free cash flows depends upon the profitability, a direct relationship is predicted between the leverage and profitability by this theory. Hovakimian *et al.* (2004) report the positive relationship of profitability with leverage. Nunkoo and Boateng (2010) also report the positive relationship between profitability and leverage. Trade off theory suggests the positive association between the profitability and debt for two reasons. First the higher the profitability the lower will be the risk of financial distress and bankruptcy consequently lower will be the capital cost.

Second high profits mean increase in taxable income that may increase firms' tax rates and resultantly increase in interest tax shield.

Based on the pecking order theory, free cash flow theory and empirical findings of the studies such as Rajan and Zingales (1995), Hovakimian *et al.* (2004), Flannery and Rangan (2006), Drobetz and Wanzenried (2006), and Mukherjee and Mahakud (2010) our hypothesis regarding profitability is:

H5: Profitability has a relationship with optimal leverage.

3.2.6 Volatility of Earnings (Business Risk)

If any firm's earnings are not stable the firm is said to have high business risk. Due to volatility of earnings that firm is more likely to be bankrupt as the firm may not be in a position to meet the debt holders' payments due to probable low earnings at any time (Drobetz & Fix, 2005). As argued by the DeAngelo and Masulis (1980) borrowing cost increases for the firms having instable earnings. Firms with volatile earnings are expected to issue lower debt. Drobetz and Fix (2005) report negative insignificant impact of volatility in earnings (business risk) on leverage. De Jong *et al.* (2008) report the negative significant impact of business risk on leverage in 14 countries of their sample. So regarding the relationship of earnings volatility with debt in this study, it is hypothesized that:

H6: Earning Volatility (Business risk) has an effect on optimal leverage.

3.2.7 Non-debt Tax Shield

Tax shield can also be obtained through other tax deductible expenses like depreciation and amortization. Availability of such expenses on firms' income statement can reduce their hunger for tax shield and provide alternate to debt tax shield (Frank & Goyal, 2009). This argument establishes the inverse relationship of non debt tax shield with optimal leverage. Flannery and Rangan (2006) report the significant negative relationship of target debt ratio with firms' depreciation (a measure of non-debt tax shield). DeMiguel and Pindado (2001) and Barton, Hill, and Sundaram (1989) report the negative significant relationship of this variable with leverage. Mukherjee and Mahakud (2010) find the negative and insignificant relationship of non debt tax shield with book value debt and positive significant relationship for market leverage. However Bradley *et al.* (1984) predict the positive relationship between non-debt tax shield and the optimal leverage based on the argument that non-debt tax deductible expenses such as the depreciation may reflect the tangibility of assets; hence firms with more tangible assets can use more debt.

Based on the findings of Heshmati (2001), Flannery and Rangan (2006), Mukherjee and Mahakud (2010), and Haron and Ibrahim (2012) it is hypothesized for this study that

H7: Non-debt tax shield has a relationship with optimal leverage.

3.2.8 Cash Flows

High cash flows are likely to raise the agency problem (Jensen & Meckling, 1976). Managers may go for raising their benefits or can make the overinvestment. To avoid this agency problem the companies with high free cash flows may increase the use of debt. Hence a positive relationship is established with the debt. While pecking order theory suggests that the firms having high cash flows will not go for external financing. So it establishes the negative relationship.

DeMiguel and Pindado (2001), Gracia and Mira (2008), and Ameer (2013) in their studies find the negative effect of cash flows on firms' debt ratios. Based on these empirical evidences and argument by Jensen and Meckling (1976), it is hypothesized that

H8: Cash flows have a relationship with optimal leverage.

3.2.9 Tax Rate

Trade-off theory suggests that the important benefit of using debt is the tax saving due to deductibility of interest as an expense. So higher the tax rate more benefit will be of using debt, hence it establishes the positive relationship of tax with leverage. Positive relationship between tax rate and leverage has been reported by Delcoure (2007), De Jong *et al.* (2008), and Fan *et al.* (2012).

DeAngelo and Masulis (1980) argue that non-debt tax shield (e.g deduction of depreciation and investment tax credit) provide alternative to benefit of using debt. So the higher the tax rate the higher will be the benefit of non-debt tax shield and less will be the use of debt. This argument establishes the negative relationship of leverage with tax rate. Antoniou *et al.* (2008), in pooled analysis, report the negative significant relationship of tax with leverage.

Based on the trade off theory, the argument of DeAngelo and Masulis (1980), and the empirical findings of Delcoure (2007), De Jong *et al.* (2008), Antoniou *et al.* (2008), and Fan *et al.* (2012) we hypothesize the relationship between tax rate and leverage as under:

H9: Tax rate has a relationship with optimal leverage.

3.2.10 Industry Median Leverage

The relevance of industry effects on level of debt has been widely investigated because firms belonging to different industries have different characteristics, hence different debt levels. Antoniou *et al*. (2008) find the differences in determinants of capital structure in different industries. Frank and Goyal (2009), Hanousek and Shamshur (2011), and Mukherjee and Mahakud (2010) find positive effect of industry median leverage suggesting that capital structures differ across industry. Hovakimian *et al.* (2004) finds industry leverage significant in debt versus dual issue regressions. Flannery and Rangan (2006) indicate the significant positive relationship between optimal leverage ratio and industry median leverage. Based on all these studies we hypothesize that

H10: Industry median leverage has a relationship with optimal debt.

3.2.11 Stock Market Development

As argued by Baker and Wurgler (2002) firms may be tilted towards equity financing if the country's stock market is developed and well functioning. This suggests the inverse relationship of stock market development with optimal debt level. Giannetti (2003) and De Jong *et al.* (2008) report the significant impact of stock market development on the leverage. Delcoure (2007) also report significant effect of stock market development on leverage. De Jong *et al.* (2008) find a negative significant impact of stock market development on the coefficient of asset tangibility hence suggesting lower use of the debt. Frank and Goyal (2009) indicate strong negative relationship of stock variance, one of the measures of stock market conditions, with leverage. Haron and Ibrahim (2012) and Haron *et al.* (2013) report the significant negative relation of the stock market development with leverage.

Based on these arguments and empirical evidences the relationship of stock market development with optimal leverage can be hypothesized as

H11: Stock market development has a relationship with optimal leverage.

3.2.12 Interest Rates

Interest rate changes may affect the level of debt. Low interest rate in economy may stimulate the firms to use more debt. Antoniou *et al*. (2008) in their study find that the term structure of interest rate has negative impact on leverage. Haron and Ibrahim (2012) report negative significant relationship of interest rate with leverage. Frank and Goyal (2004) report insignificant positive correlation between interest rates and leverage. Haron *et al.* (2013) report positive significant relationship of leverage with interest rates. Market timing theory establishes negative relationship of market interest rates with leverage.

In accordance with the market timing theory and findings of Antoniou *et al.* (2008) and Haron and Ibrahim (2012), and Haron *et al.* (2013), it is hypothesized that:

H12: Interest rates have a relationship with optimal leverage.

3.2.13 Gross Domestic Product (GDP)

Economic growth affects the firms' performance, probability of bankruptcy, financial markets, and taxes. Booth *et al.* (2001) find the different impacts of GDP growth rates on the leverage in different countries. De Jong *et al.* (2008) indicate the significant influence of the GDP growth rate on leverage. Kayo and Kimura (2011) report the negative effect of GDP growth rate on leverage. Haron and Ibrahim (2012) indicate negative relationship between economic growth and debt. De Jong *et al.* (2008), Mukherjee and Mahakud (2010), and Haron *et al.* (2013) report positive significant relationship of GDP with

leverage. Ngugi (2008) also reports that real GDP has significant positive association with debt.

In line with the findings of these studies our hypothesis regarding the GDP growth rate and leverage is:

H13: GDP growth rate has a relationship with optimal leverage.

3.2.14 Distance between Observed and Optimal Leverage and Speed of Adjustment

In presence of high total fixed cost of changing capital structure (transaction cost) firms avoid frequent issuance and repurchase activities to change their capital structure (Haron *et al.,* 2013). Firms may move to target debt ratio if there is large gap between actual and target leverage and the benefits of moving towards target are higher than the cost incurred. Mukherjee and Mahakud (2010) and Haas and Peeters (2006) report the significant positive relationship between the speed of adjustment and absolute difference between observed leverage and target leverage. Drobetz and Wanzenried (2006) report the weak direct relationship between adjustment speed and distance from target debt.

Negative relationship can be based on the argument that firms may quickly adjust towards target if the gap is small and can be adjusted with retained earnings. The negative relationship between adjustment speed and distance to optimal debt is confirmed in the empirical studies of Loof (2003), Haron *et al.* (2013), Banerjee *et al.* (2004), and Aybar-Arias *et al.* (2012).

Following the findings of Banerjee *et al.* (2004), Haas and Peeters (2006), Mukherjee and Mahakud (2010), and Haron *et al.* (2013) it is hypothesized for this study as:

H14: Distance between observed and optimal leverage has a relationship with the speed of adjustment towards optimal leverage.

3.2.15 Size and Speed of Adjustment

The cost of changing capital structure is large and mainly fixed; so relatively it will be cheaper for large firms to adjust towards target. Further due to better analysts' coverage the large firms can have easy access to the capital markets (Drobetz & Wanzenried, 2006). These arguments lead us to expect positive relationship of firms' size of the firm with its adjustment speed towards optimal debt ratio. Drobetz *et al.* (2007), Haron *et al.* (2013) and Mukherjee and Mahakud (2010) in their studies found the positive relationship between the size and the speed of adjustment towards optimal debt ratio confirming the notion that cost of adjustment for larger firms is lower than smaller firms. However, Chipeta and Mbululu (2013) report negative significant relationship of size with adjustment speed.

Based on the above described arguments and empirical evidences of the many studies, the relationship between size of the firms and its speed of adjustment is hypothesized as:

H15: Size of the firm has a relationship with speed of adjustment towards optimal leverage.

3.2.16 Growth and Speed of Adjustment

Growing firms frequently raise external capital to meet their growth needs as they have limited internal funds. Such firms are expected to use those financing alternatives that bring them closer to optimal debt ratio (Drobetz *et al.,* 2007). Therefore, a positive relationship is established between firms' growth rate and adjustment speed towards optimal leverage. A significant relationship between growth and the speed of adjustment towards target leverage has been reported by Mukherjee and Mahakud (2010). However the relationship is negative for market based leverage and positive for book based leverage. Drobetz and Wanzenried (2006) and Oztekin and Flannery (2012) also find the positive association between speed of adjustment and growth. Heshmati (2001) concludes negative significant relationship of growth with adjustment speed.

Based on the arguments and findings of Heshmati (2001), Mukherjee and Mahakud (2010), and Drobetz and Wanzenried (2006) the relationship of growth with adjustment speed is hypothesized as under

H16: Firms' growth rate has positive relationship with adjustment speed towards optimal leverage.

3.2.17 Profitability and Speed of Adjustment

Profitable firms can find it relatively easier to adjust towards their target ratios due to availability of internal funds (Haron *et al.,* 2013). Availability of internal funds reduces the cost of adjustment towards target, thus establishing the positive association of

profitability with the speed of adjustment. Heshmati (2001) and Oztekin and Flannery (2012), against their expectations, find negative significant relationship of profitability with adjustment speed. Haron *et al.* (2013) report the positive relationship between the firm's profitability and adjustment speed towards optimal debt.

Based on the arguments and empirical evidences of Heshmati (2001), Oztekin and Flannery (2012), and Haron *et al.* (2013) the relationship of profitability with speed of adjustment is hypothesized as:

H17: Profitability has a relationship with the speed of adjustment towards optimal leverage.

3.2.18 Effective Tax Rate

The tax benefit of using debt should increase the value of reaching and maintaining the target debt ratio, hence establishing the positive relationship between the tax rate and speed of adjustment. Oztekin (2013) reports the significant positive relationship between tax and speed of adjustment towards target debt ratio. Clark *et al.* (2009) find the positive significant relationship between effective tax rate and speed of adjustment for developing countries and negative relationship for developed countries. Lemma and Negash (2014) also report the positive significant impact of tax rate on adjustment speed for African economies.

In line with the argument and findings of empirical studies it is hypothesized as:

H18: Effective tax rate has a relationship with the speed of adjustment towards optimal leverage.

3.2.19 GDP and Speed of Adjustment

Arguments have been made that good economic conditions facilitate the movement towards optimal leverage. The adjustment cost towards target debt is lower in good economic conditions (Korajczyk & Levy, 2003). Clark *et al.* (2009) find the significant relationship of the GDP growth rate with the adjustment speed in subsample of developed countries. Haas and Peeters (2006) and Chipeta and Mbululu (2013) report the positive significant relationship between GDP growth rate and speed of adjustment for 3 out of 10 countries and negative significant relationship for one country of their sample. Similarly, Wang (2013) also reports the positive significant relationship of GDP growth rate with adjustment speed.

It seems logical to hypothesize that:

H19: GDP growth rate has a relationship with speed of adjustment towards optimal leverage.

3.2.20 Stock Market Development and Speed of Adjustment

As argued by Demirguc-Kunt and Maksimovic (1996) the development of financial sector improves the supply of capital in developing countries and leads to the change in

composition of capital structure in developed countries. This factor's effect on adjustment speed has not been widely investigated. Clark *et al*. (2009) report the stock market development as a significant factor which affects the speed of adjustment towards target capital structure. Lemma and Negash (2014) report the impact of stock market development on the adjustment speed to be based on the measure of leverage used.

Based on these arguments and empirical findings the relationship between stock market development and speed of adjustment it is hypothesized as:

H20: Stock market development has a relationship with speed of adjustment towards optimal leverage.

3.2.21 Interest Rate and Speed of Adjustment

Interest rate is important factor to be considered in financial restructuring. Drobetz *et al*. (2007) provides the negative relationship between short term interest rates and the adjustment speed. Interest rate is found to be significant and negatively associated in one out of 10 countries' sample by Haas and Peeters (2006).

Based on these empirical evidences it is hypothesized that

H21: Interest rates have relationship with speed of adjustment towards optimal leverage.

3.3 Measurement of Variables

This section discusses the method of the measurement of the variables used in this study.

3.3.1 Leverage

Bevan and Danbolt (2002) report that the factors affecting debt level vary significantly and are dependent upon the component of debt analyzed. Leverage can be measured in different ways depending upon the purpose of the study (Rajan & Zingales, 1995). Haron (2014), using both static and dynamic models, concludes that inconsistencies in the results of the empirical studies regarding the capital structure arise mainly from the measure of leverage used. If the objective is to understand the relationship between agency problem and debt, like Jensen and Meckling (1976) and Myers (1977), than perhaps total debt to total market value of equity can be used. If the purpose is to understand the role of debt in transferring control, like Aghion and Bolton (1992), from shareholders to bondholders than perhaps it is important to measure the firms' ability to meet fixed payments. In this case interest coverage ratio may be more relevant. Usually the ratio of total liabilities to total assets is taken as measure of leverage. The advantage of using total liabilities to total assets as the measure of the firm's leverage is that the data for this measure is commonly available for all the firms (Joeveer, 2013). This measures the residual for stockholders if liquidation takes place. This ratio also takes in account the liabilities like accounts payable and pension liabilities, hence may overstate the true leverage.

The other measures of leverage that can be used are debt to capital and debt to net assets. Rajan and Zingales (1995) use all above mentioned measures of leverage in their study to calculate the descriptive statistics of this measure. And to estimate the model, Rajan and Zingales (1995) use book leverage and market leverage. Booth *et al.* (2001) use two different measures of leverage for different countries given the accounting and reporting differences. The measures used are i) total debt ratio calculated as total liabilities divided by total liabilities plus net worth and ii) long term book debt ratio calculated as total liabilities net of current liabilities divided by total liabilities net of current liabilities plus net worth. Following Titman and Wessels (1988), Delcoure (2007) also uses three measures of the debt. These measures are overall leverage calculated as total debt to total assets, long term leverage measured as long term debt to total assets, and short term leverage measured as short term debt to total assets. For all these measures, book values are used.

Frank and Goyal (2009) use four measures of leverage. They use ratios of total debt to both market values and book values of assets and ratios of the long term debt to both market values and book values of assets. Hanousek and Shamshur (2011) measure leverage as debt divided by debt plus equity; where debt is net of trade credit. Kayo and Kimura (2011) use both market value of leverage and book value of leverage calculated as long term debt divided by total firm market value of equity plus debt and long term debt divided by total firm book value of equity plus debt. Deesomsak *et al*. (2004) measure the leverage as total debt divided by total debt plus market value of equity plus book value of preference shares. Mukherjee and Mahakud (2010) use the quasi market

leverage measured as the book value of total debt to book value of total debt plus market value of equity. Drobetz and Wanzenried (2006) use two measures of leverage i) total non equity liabilities to total assets and ii) interest bearing debt to capital. Joeveer (2013) uses ratio of total liabilities to total assets (book value) and ratio of short term debt plus long term debt over sum of the debt and book value of shareholders' equity as the measures of the leverage. Cho *et al.* (2014) use long term debt to book value of total assets (LTD/TA) and total debt (LTD+STD/TA) as the measures of the firms' leverage.

In this study, following Titman and Wessels (1988), Delcoure (2007), Mukherjee and Mahakud (2010), and Cho *et al.* (2014), this study uses four measures of leverage. The four measures of the leverage used are i) total liabilities (Datastream code WC03351) to total assets (WC02999), ii) long term leverage measured as long term debt (WC03251) to total assets (WC02999) iii) total debt (WC03255) divided by the sum of the market value of equity (MV) and total debt (WC03255), and iv) total debt (WC03255) to total assets (WC02999). Kim, Heshmati, and Aoun (2005) argue that firms' financial managers are concerned with bankruptcy which is related to the book value of debt rather than market value of debt. Given this argument empirical studies prefer using book leverage ratios. However, following Mukherjee and Mahakud (2010), this study also uses the quasi market value leverage ratio.

The long term debt to total assets is used as the measure of the leverage in this study mainly because of the reason that firms' leverage is largely driven by the long term debt (Johnson, 2003). Tax response of long term debt is significantly higher (Feld *et al.* 2013).

$$\text{Total Liabilities} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

$$\text{Long Term Leverage} = \frac{\text{Long Term debt}}{\text{Total Assets}}$$

$$\text{Market Leverage} = \frac{\text{Total debt}}{\text{Market Value of equity} + \text{Total debt}}$$

$$\text{Total debt} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

3.3.2 Tangibility

Rajan and Zingales (1995), Loof (2003), Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), and Kayo and Kimura (2011) use ratio of fixed assets to total assets as measure of tangibility. Delcoure (2007) use the net plant, property and inventory divided by total assets as measure of the tangibility. Booth *et al.* (2001) use total assets net of current assets divided by total assets as measure of the tangibility. Hanousek and Shamshur (2011) use ratio of tangible assets to total assets as the measure of the tangibility. Baker and Wurgler (2002), Clark *et al.* (2009), Hovakimian *et al*. (2004), and Cho *et al.* (2014) use ratio of net plant property and equipment to total assets in percentage as the measure of tangibility.

In this study, following Delcoure (2007), ratio of net plant, property, and equipment (WC02501) and inventory (WC02101) to total assets (WC02999) is used as the measure of the tangibility.

$$\text{Tangibility} = \frac{\text{Net Property, Plant, and Equipment} + \text{Inventory}}{\text{Total Asets}}$$

3.3.3 Growth

In research studies relevant to capital structure decisions several proxies of growth are used. Generally, the market-to-book ratio is considered as proxy of investment opportunities. Frank and Goyal, (2009) and Cook and Tang (2010) use market value of assets divided by the book value of assets as the proxy of market-to-book ratio. Booth *et al*. (2001) use market value of equity divided by the net worth as the proxy of the growth. Baker and Wurgler (2002) in their study used assets net of book equity plus market equity divided by the assets as the measure of the growth. Drobetz and Fix (2005), Drobetz and Wanzenried (2006), Clark *et al.* (2009), Haron *et al.* (2013), and Cho *et al.* (2014) use market value of equity divided by book value of equity as proxy of the growth. Loof (2003) and Chakraborty (2010) use the percentage change in total assets from the last year as the measure of the growth.

In our study, following Loof (2003) and Chakraborty (2010), the percentage change in total assets (WC02999) from the last year is used as the measure of the firm's growth.

$$\text{Growth} = \%\ \text{change in Total Assets}$$

3.3.4 Size of the Firm

Kayo and Kimura (2011), Rajan and Zingales (1995), Booth *et al.* (2001), Baker and Wurgler (2002), Titman and Wessels (1988), Drobetz and Wanzenried (2006), and Hovakimian *et al*. (2004) use natural logarithm of total sales as measure of the firms' size. Loof (2003) used employment as the measure of the size. The studies conducted by Delcoure (2007), Deesomsak *et al.* (2004), Clark *et al.* (2009), Mukherjee and Mahakud (2010), Cook and Tang (2010), Hanousek and Shamshur, (2011), and Haron *et al.* (2013) use natural logarithm of firms' total assets as the measure of size of the firm.

In this study the measure of the firms' size is used as the natural logarithm of firms' total assets (WC02999) as in Delcoure (2007), Deesomsak *et al.* (2004), Clark *et al.* (2009), Mukherjee and Mahakud (2010), Hanousek and Shamshur (2011), and Haron *et al*. (2013).

$$\text{Size} = ln\text{Total Assets}$$

3.3.5 Profitability

Different measures of profitability are found in different studies. Kayo and Kimura (2011), Booth *et al*. (2001), Rajan and Zingales (1995), Hanousek and Shamshur (2011), and Drobetz and Wanzenried (2006) use ratio of operating income (earnings before tax) to total assets as the measure of the profitability. Baker and Wurgler (2002), Fama and French (2002), Flannery and Rangan (2006), Clark *et al*. (2009), Cook and Tang (2010), and Haron *et al.* (2013) use EBIT divided by total assets as expressed in percentage terms

as measure of the profitability. Hovakimian *et al*. (2004) used ratio of EBITDA (Earnings before Interest, Taxes, Depreciation, and Amortization) to book value of assets as measure of the profitability. Titman and Wessel (1988) and Drobetz and Fix (2005) in their studies use two measures of profitability. First is the ratio of operating income to total assets and second is the gross margin measured as operating income divided by total sales. Byoun (2008) also uses the ratio of operating income to total assets as the measure of the profitability. Mukherjee and Mahakud (2010) used the net income to total assets as the profitability measure.

In this study, following Titman and Wessel (1988), Drobetz and Fix (2005), and Byoun (2008), we use the ratio of operating income (WC01250) to total assets (WC02999) as measure of the profitability.

$$\text{Profitability} = \frac{\text{Operating Income}}{\text{Total Assets}}$$

3.3.6 Business Risk (Earning Volatility)

Business risk has been measured differently in different research studies of the capital structure. Variance of the stock returns has been used as the proxy of risk by Frank and Goyal (2009). De Jong *et al.* (2008) use standard deviation of operating income divided by book value of total assets as the proxy of business risk. Booth *et al*. (2001) use standard deviation of the (ROA) as the proxy of the firm business risk. Viviani (2008) calculate the business risk as standard deviation of EBITDA net of mean of the EBITDA.

De Jong and Dijk (2007) measure the risk on a 7 point scale in a survey as volatility of profits and volatility of sales.

Bradley *et al.* (1984) and Drobetz and Fix (2005) use the standard deviation of the first difference of a firms' annual profits, scaled by the average of the firms' total assets. Dhaliwal *et al*. (2006) use the standard deviation of EBIT as the proxy of the firms' operating risk. Earning volatility is measured as the first difference of profits minus the average of the first differences by the Antoniou *et al.* (2008) in their study. Deesomsak *et al.* (2004) measure volatility as the absolute difference between the annual percentage change in EBIT and average of this change. Loof (2003) uses the variance of sales as the measure of income variability. Haron *et al.* (2013) uses the yearly change in EBIT as the measure of the firm's business risk.

In this study, following De Jong *et al.* (2008), volatility is measured as the standard deviation of operating income (WC01250) divided by book value of total assets (WC02999). Operating income data of the firms, to calculate the standard deviation, has been taken for the same period that is 2003- 2012 instead of past data. This has been done due to unavailability of the data for majority of the Pakistani firms in Datastream prior to 2003. By doing this it is implicitly assumed that firms operating risk in past and future remains same.

$$\text{Earning Volatility} = \frac{\text{Standard deviation of operating income of 10 years}}{\text{Total Assets}}$$

3.3.7 Non-debt Tax Shield

Haron *et al.* (2013), Cook and Tang (2010), and Mukherjee and Mahakud (2010) use the depreciation expense divided by firms' total assets as the measure of the non debt tax shield. Clark *et al*. (2009) and Chakraborty (2010) use depreciation and amortization expense divided by total assets as the measure of non debt tax shield. DeMiguel and Pindado (2001) use the non-debt tax shield measured as the earnings before taxes less the ratio between the taxes paid and the firm's tax rate.

Following Clark *et al.* (2009) and Chakraborty (2010), this study uses the ratio of depreciation, depletion, and amortization expense (WC01151) to firms' total assets (WC02999) as the proxy of the non debt tax shield.

$$\text{NDTS} = \frac{\text{Depreciation, depletion, and Amortization Expense}}{\text{Total Assets}}$$

3.3.8 Cash

Binsbergen, Graham, and Yang (2011) use the net cash flows divided by total assets as the proxy of cash flows in their study. Viviani (2008) uses cash divided by total assets as the proxy of liquidity. De Jong and Dijk (2007) use three types of cash flows measured on a 7 point scale in a survey. They use free cash flows from projects, liquidity, and internal funds. De Miguel and Pindado (2001) measure cash as adding non cash deductions to EBIT. Non cash deductions considered by them are depreciation expenses and provisions. Lopez-Gracia and Mira (2008) add back depreciation to net income to measure the cash flows.

In this study, following the Lopez-Gracia and Mira (2008), the ratio of the sum of the depreciation (WC01151) and net income (WC01751) to total assets (WC02999) is used as the measure of the cash.

$$\text{Cash Flows } = \frac{\text{Depreciation} + \text{Net income}}{\text{Total Assets}}$$

3.3.9 Taxes

Delcoure (2007) and Booth *et al*. (2001) use the average effective tax rate as the proxy of this measure. Lemmon *et al*. (2008), Dhaliwal *et al.* (2006), and Welch (2004) use Graham's tax rates (simulated marginal tax rates obtained from John Graham). Frank and Goyal (2009) used top tax rates as measure of the taxes. Antoniou *et al.* (2008), Clark *et al.* (2009), and Cho *et al*. (2014) in their studies use effective tax rate calculated as total taxes divided by pretax income. Wang (2013) use the highest statutory corporate income tax rate as measure of this variable.

Following Antoniou *et al.* (2008), Clark *et al.* (2009), and Cho *et al.* (2014) the proxy of taxes in this study is used as the effective tax rate calculated as total taxes (WC01451) divided by taxable income or pretax income (WC01401).

$$\text{Effective Tax Rate} = \frac{\text{Total taxes Paid}}{\text{Pretax Income}}$$

3.3.10 Industry Median Leverage

To understand the impact of the industry characteristics, Lemon *et al.* (2008), Mukherjee and Mahakud (2010), Getzmann *et al.* (2010), Flannery and Rangan (2006), and Wang (2013) use the industry median leverage. To gain insights into the industry differences in optimal capital structure this study also uses the industry median leverage. Industries are identified on the basis of classifications given in Datastream code INDM. This code indentifies the industry for every listed firm. The firms belonging to same industry are grouped together and the median of their leverage is calculated for every year.

3.3.11 Stock Market Development

Frank and Goyal (2009) use the cumulative raw returns, obtained as compounding monthly returns from CRSP (Centre for Research in Security Prices) and the cumulative stock market returns measured as annual CRSP Value weighted Index returns, as the proxies of stock market conditions. De Jong *et al.* (2008) and Haron *et al*. (2013) use stock market capitalization divided by the country's GDP as measure of the stock market development. Following De Jong *et al.* (2008) and Haron *et al.* (2013) stock market capitalization divided by the country's GDP is used as the measure of the stock market development in this study. The data for this variable is also taken from the WDI of the World Bank.

$$\text{Stock Market Development} = \frac{\text{Stock Market Capitalization}}{\text{GDP}}$$

3.3.12 Interest Rate

Frank and Goyal (2004) use series of discount rates as the measure of the interest rates. The discount rate series was obtained from the Federal Reserve board. Antoniou *et al.* (2008) use the term structure of interest rate measured as the annual difference between the long term government bond and Treasury bill having 3 months maturity. Deesomsak *et al.* (2004) measures the level of interest rates as the lending rate, which is the maximum rate charged by the commercial banks in the countries. Haron *et al*. (2013) use the lending rate as the interest rate. Drobetz and Wanzenried (2006) used three months Eurodollar deposit rate as the proxy of short term interest rates. Drobetz *et al*. (2007) use three months money market rate as the measure of the short term interest rates.

Following Haron *et al*. (2013) and Deesomsak *et al.* (2004), this study uses the maximum lending rate from World Development Indicators (WDI) of the World Bank as the proxy of interest rate.

3.3.13 Gross Domestic Product (GDP)

Gross Domestic Product (GDP) of the countries has been taken as the determinant of firms' capital structure in some studies. De Jong *et al.* (2008) use the average real GDP growth rate as measure of the GDP. Booth *et al.* (2001) in their study regarding the capital structures in developing countries have also used average real GDP growth rate as the proxy of this variable. Kayo and Kimura (2011) use annual growth of Gross Domestic Product as measure of the GDP. Oztekin and Flannery (2012) use the annual growth in

nominal GDP. Clark *et al*. (2009) use the average GDP growth for the sample period. Wang (2013) uses the nominal GDP growth rate in percentage. Cook and Tang (2010) use real GDP growth rate. In this study, following the Oztekin and Flannery (2012) and Cho *et al.* (2014) the annual growth in nominal GDP from World Bank's WDI is used.

GDP Growth = Annual growth in nominal GDP

3.3.14 Distance between Optimal Leverage and Observed Leverage

This study uses distance between target debt and observed debt as one of the determinants of adjustment speed towards target capital structure. It is measured as the absolute difference between observed debt and target debt of the firm. The target debt is unobservable and is the fitted value from the fixed effect regressions of the leverage ratios of the firms on capital structure determinants (Drobetz & Wanzenried, 2006) while observed debt is the actual debt levels used by the firms. This method of measuring distance variable using fixed effect regression is also adopted in other empirical studies of Haron *et al.* (2013), Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), and Lemma and Negash (2014).

Table 3.1 summarizes the operational definitions of all variables considered in this study as the determinants of target capital structure and determinants of adjustment speed towards target capital structure.

Table 3.1

Operational Definition of Variables

Variable	Operational Definition
Dependent Variables	
Total Liabilities	Ratio of total liabilities to total assets.
Long Term Leverage	Ratio of book value of long term debt to total assets.
Market Leverage	Ratio of total debt to market value of equity and total debt.
Total debt	Ratio of total debt to total assets.
Explanatory Variables	
Profitability	Ratio of operating income to total assets.
Tangibility	Ratio of net property, plant, and equipment and inventory to total assets.
Growth	Percentage change in total assets from the last year.
Tax Rate	Ratio of taxes paid to total taxable income (pretax income).
Earning Volatility	Ratio of the standard deviation of operating income to total assets.
Non-debt Tax Shield	Ratio of annual depreciation, depletion, and amortization expense to total assets.
Cash Flows	Ratio of the sum of depreciation and net income to total assets.
Firm Size	Natural Logarithm of total assets of the firm.
Industry Median Leverage	Median Leverage of the industry.
GDP Growth Rate	Annual growth in nominal GDP.
Interest Rate	Maximum Lending rate in the country using world Bank's WDI.
Stock Market Development	Ratio of Stock Market capitalization to country's GDP.
Distance	Absolute difference between observed debt and optimal debt where optimal debt is the fitted value from the fixed effect regressions of the firms on capital structure determinants.

3.4 Chapter Summary

This chapter outlines the research design that includes research framework, estimation methodology, sampling framework and technique, data sources and data analysis techniques. The study uses the partial adjustment model using difference GMM technique of estimation. Non financial listed firms listed at KSE Pakistan are investigated on the issue of dynamic capital structure. Datastream is used as the main database to collect the financial data of the firms.

This chapter further discusses the development of hypothesis for this study on the basis of underpinning theories and earlier empirical evidences from both developed and developing countries. Hypothesis development is followed by the discussion of the measurement of the variables used in this study.

CHAPTER FOUR

EMPIRICAL FINDINGS AND DISCUSSION

4.0 Introduction

This chapter reports and discusses the results of this study, which is aimed at estimating the magnitude of the adjustment speed towards target capital structure, identifying determinants of optimal capital structure and determinants of adjustment speed towards target capital structure for Pakistani public limited firms listed at Karachi Stock Exchange. This study uses Arellano and Bond (1991) difference GMM to estimate the following dynamic model for estimating the adjustment speed and determinants of target debt.

$$\begin{aligned} OD_{it} &= (1-\delta_{it})OD_{it-1} + \delta_{it}\beta_1 pro_{it} + \delta_{it}\beta_2 \tan_{it} + \delta_{it}\beta_3 gro_{it} + \delta_{it}\beta_4 siz_{it} \\ &+\delta_{it}\beta_5 erv_{it} + \delta_{it}\beta_6 csh_{it} + \delta_{it}\beta_7 txr_{it} + \delta_{it}\beta_8 ndt_{it} + \delta_{it}\beta_9 iml_{it} + \delta_{it}\beta_{10} gdp_t + \\ &\delta_{it}\beta_{11} inr_t + \delta_{it}\beta_{12} smd_t + u_{it} \end{aligned} \quad (8)$$

Replacing (1- δ_{it}) with λ_0 and $\delta it\ \beta_k$ with λ_k, equation (8) can be re-written as:

$$\begin{aligned} OD_{it} &= \lambda_0 OD_{it-1} + \lambda_1 pro_{it} + \lambda_2 \tan_{it} + \lambda_3 gro_{it} + \lambda_4 siz_{it} + \lambda_5 erv_{it} + \\ &\lambda_6 csh_{it} + \lambda_7 txr_{it} + \lambda_8 ndt_{it} + \lambda_9 iml_{it} + \lambda_{10} gdp_t + \lambda_{11} inr_t + \lambda_{12} smd_t + u_{it} \end{aligned} \quad (9)$$

The coefficient δ_{it} refers to adjustment coefficient or adjustment speed. It shows the amount of required adjustment between two subsequent periods or rate of convergence of observed debt (OD_{it}) to its target debt (TD). The determinants of optimal debt used in this study are profitability (*pro*), tangibility (*tan*), growth (*gro*), size (*siz)*, earning volatility

(*erv*), cash (*csh*), tax rate (*txr*), and non debt tax shield (*ndt*), and industry specific factor such as industry median leverage (iml), and country specific factors such as GDP growth rate (*gdp*), interest rate (*inr*), and stock market development (smd).

For identifying the determinants of adjustment speed towards target capital structure following dynamic model is also estimated using Arellano and Bond (1991) difference GMM.

$$OD_{it} = (1-\alpha_0)OD_{it-1} - \alpha_k X_{it} OD_{it-1} + \alpha_0 \sum_{i=1}^{n} B_k V_{kit} + \alpha_k \sum_{i=1}^{n} X_{it} B_k V_{kit} + u_{it} \quad (12)$$

Where $X_{it\ is}$ the vector of firm and country specific variables determining the adjustment speed, and $V_{kit}$is the vector of firm, industry, and country specific variables determining the target capital structure. In this model our interest is in α_k parameter which is the coefficient on interaction term between explanatory variable of speed of adjustment, X_{it}, and lagged debt variable *ODit-1.* This coefficient is interpreted for the determinants of adjustment speed.

The results of fixed effect regression are also presented. As discussed in chapter 03, fixed effect regression is used to estimate the distance variable, which is the absolute difference between observed debt and fitted value of debt estimated using fixed effect regression. However the results of the determinants of target debt are based on the estimation of equation (9) using difference GMM.

The rest of this chapter is organized as follows. Section 4.1 describes the sample of the study. Section 4.2 provides the descriptive statistics and collinearity of the variables used in this study. Section 4.3 presents and discusses the results of fixed effect regression used to obtain fitted values of optimal debt. Section 4.4 reports and discusses the results regarding the magnitude of adjustment speed towards target capital structure. Section 4.5 presents and discusses the results of the effects of firm specific variables and industry median leverage on target capital structure. Section 4.6 reports and discusses the results of country specific variables on target capital structure. Section 4.7 reports and discusses the results regarding the impact of various firm and country related variables on the adjustment speed. Section 4.8 presents the summary of the chapter.

4.1 Sample of the Study

Sample of this study comprises of 143 non financial firms listed at Karachi Stock Exchange of Pakistan. Data of these firms from 2003 to 2012 is obtained from Thomson Reuters Datastream database. Datastream contains the data for 271 companies listed at Karachi Stock Exchange of Pakistan. For some of the firms Datastream contains only the share price information. Excluding such firms and firms of the financial sector, the final sample comprises of 143 firms with 1190 firm year observations. This constitutes an unbalanced panel data with average of 8.32 years of the data for every firm.

Figure 4.1 and table 4.1 presents industry wise distribution of the firms considered in the sample of this study. This industrial classification has been based on the classification

given in Datastream using code INDM. Table 4.1 shows that there are 16 industries in which there is only one firm. Furthermore, there are 8 industries out of 32 in which the number of firms is more than 5.

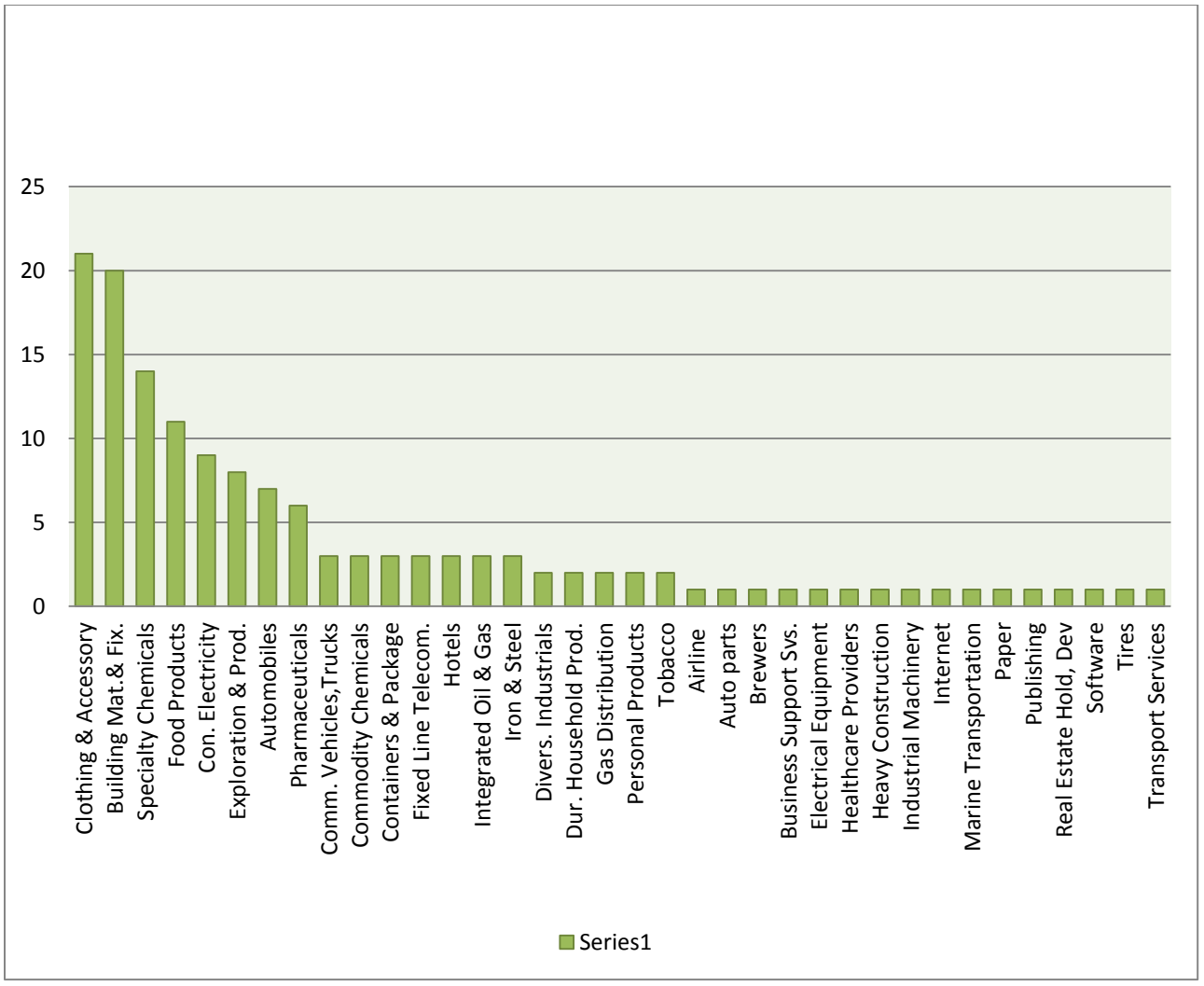

Figure 4.1

Industry wise Distribution of the Firms

Table 4.1
Industry wise Distribution of the Firms

No	Industry	Number of Firms	Firm Year observations
1	Clothing & Accessory	21	181
2	Building Mat.& Fix.	20	183
3	Specialty Chemicals	14	104
4	Food Products	11	86
5	Con. Electricity	9	67
6	Exploration & Prod.	8	72
7	Automobiles	7	50
8	Pharmaceuticals	6	50
9	Comm. Vehicles, Trucks	3	26
10	Commodity Chemicals	3	29
11	Containers & Package	3	23
12	Fixed Line Telecom.	3	29
13	Hotels	3	23
14	Integrated Oil & Gas	3	28
15	Iron & Steel	3	26
16	Divers. Industrials	2	17
17	Dur. Household Prod.	2	18
18	Gas Distribution	2	20
19	Personal Products	2	18
20	Tobacco	2	19
21	Airline	1	10
22	Auto parts	1	4
23	Brewers	1	10
24	Business Support Svs.	1	6
25	Electrical Equipment	1	8
26	Healthcare Providers	1	8
27	Heavy Construction	1	9
28	Industrial Machinery	1	10
29	Internet	1	4
30	Marine Transportation	1	10
31	Paper	1	8
32	Publishing	1	5
33	Real Estate Hold, Dev	1	7
34	Software	1	8
35	Tires	1	7
36	Transport Services	1	7
	Total	143	1190

4.2. Descriptive Statistics and Multicollinearity

Table 4.2 reports the descriptive statistics of the variables, both dependent and independent, used in this study. Column 2 of this table reports the number of observations for every variable. Since the unbalanced panel data has been used in this study, the number of observations for all variables is not same that is 1190. Leverage, measured as total liabilities to total assets, is found to be 56.5 percent for sample of Pakistani firms. It is lower than 65.2 percent reported by Booth *et al.* (2001) for Pakistan and 69 percent and 75.8 percent of the neighboring country India's leverage, as reported by Mukherjee and Mahakud (2010) and Chakraborty (2010) respectively, for sample of manufacturing firms. The average long term debt ratio for Pakistani firms is 13.8 percent which is lower than 16.6 percent reported by De Jong *et al.* (2008) for Pakistan and higher than 12 percent of 48 countries sampled by Cho *et al.* (2014). Average total debt ratio, another proxy of leverage, turns out to be 29.15 percent of total assets for sample of Pakistani firms, which is lower than 35.5 percent and 40 percent as reported by Chakraborty (2010) India and Fan *et al.* (2012) for Pakistan respectively. Ratio of quasi market value leverage is 36.5 percent which is also lower than India's 55 percent as reported by Mukherjee and Mahakud (2010) and higher than Australia's 18.5 percent, Singapore's 24 percent and Malaysia's 27 percent (Deesomsak *et al*., 2004).

Average profitability for Pakistani firms is 10.51 percent. Tangibility on average is 66 percent of total assets for the sample. Delcoure (2007), using same proxy, report lower average tangibility for Czech Republic, Slovakia and Poland than Pakistan's. Average

growth in total assets for Pakistan is 21.5 percent which is higher than Sweden's 3.5 percent on same proxy as reported by Loof (2003).

Average effective tax rate for Pakistani firms is 35.29 percent which is higher than the average of 25 percent of 48 countries sampled by Cho *et al.* (2014). The average earning volatility for Pakistani firms is 10.26 percent which is higher than the majority of the countries sampled by De Jong *et al*. (2008). This confirms Pakistani firms to be riskier than many other countries. Mean non-debt tax shield for sample of Pakistani firms is 3.5 percent which is lower than 4 percent of Indian sample firms of Mukherjee and Mahakud (2010). Average cash for Pakistani firms is 9.75 percent. Average log size of the Pakistani firms is 16, which is higher than the sample of Swiss firms (Drobetz & Wanzenried, 2006) and for South African firms (Chipeta Mbululu, 2013). Industry median leverage ratios are not very different from the average ratios of the firms for full sample of Pakistani firms.

GDP growth rate in Pakistan has average of 4.08 percent for the period 2004-2013. Average lending rate in Pakistan for the same period is 12.45 percent. Average stock market development is 25.6 times of the country's GDP for 2004-2013.

Table 4.2
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ODtl	1190	0.5656	0.2611	0.0315	2.8792
ODltd	1185	0.1384	0.1688	0	1.1505
ODtd	1165	0.2915	0.2394	0	1.4973
ODmvd	1164	0.3655	0.3140	0	0.9881
pro	1184	0.1051	0.1266	-0.4548	0.6244
tan	1183	0.6625	0.2174	0.0039	0.9986
gro	1190	0.2151	0.6085	-0.6329	14.1133
tax	952	0.2670	2.1637	-2.3052	0.9789
erv	1190	0.1026	0.1298	0.0059	2.1015
ndt	1179	0.0354	0.0233	4.84E-05	0.3594
csh	1179	0.0976	0.1063	-0.3998	0.4810
siz	1190	15.9630	1.3615	12.2337	19.6623
imltl	1190	0.5677	0.1643	0.0759	1.4884
imltd	1189	0.2791	0.1792	0	0.9224
imlltd	1189	0.1215	0.1133	0	0.7458
imlmvd	1185	0.3434	0.2674	0	0.9665
gdp	1190	4.0843	2.0303	1.6067	7.6673
inr	1119	12.4460	2.1596	7.2575	14.5375
smd	1190	25.5823	10.8169	13.8117	46.1082
ds_{tl}	1190	.0968	.12803	3.11e-07	1.576241
ds_{td}	1190	.0708	.0849	6.43e-07	1.0458
ds_{ltd}	1190	.0612	.0791	9.39e-08	.7259
ds_{mvd}	1190	.0860	.0926	2.81e-07	.6546

Note: This table presents the descriptive statistics of the dependent and independent variables used in this study. *ODtl* is the ratio of total liabilities to total assets, a measure of leverage. *ODltd* is the ratio of book value of long term debt to total assets, the second measure of the leverage. *ODtd* is the ratio of total debt to total assets, the third measure of the leverage. *ODmvd* is the ratio of total debt to market value of equity and total debt, the fourth measure of the leverage. *pro* is the profitability measured as the ratio of operating income to total assets. *tan* is the tangibility measured as the ratio of net property, plant, and equipment and inventory to total assets. *gro* is the firms' growth measured as the percentage change in total assets from the last year. *tax* is the firms' effective tax rate measured as the ratio of taxes paid to total taxable income (pretax income). e*rv* is the earning volatility measured as the ratio of the standard deviation of operating income to total assets. *ndt* is the non debt tax shield measured as the ratio of annual depreciation, depletion, and amortization expense to total assets. *csh* is the cash measured as the ratio of the sum of depreciation and net income to total assets. *siz* is the firm size measured as the natural logarithm of total assets of the firm. *Imltl* is the industry median leverage using total liabilities as the measure of the leverage. *imltd* is the industry median leverage using total debt as the measure of the leverage. *imlltd* is the industry median leverage using long term debt as the measure of leverage. *imlmvd* is the industry median leverage using market value leverage as the measure of the debt. *gdp* is the annual growth in nominal GDP. *inr* is the interest rate, which is the maximum lending rate in the country using world Bank's WDI. *smd* is the stock market development measured as the Ratio of Stock Market capitalization to country's GDP. ds is the distance between actual and optimal leverage using different measures of leverage.

Table 4.3

Correlation Matrix

	pro	tan	gro	tax	erv	ndt	csh	siz	imltl	imltd	imlltd	imlmvd	gdp	inr	smd
pro	1.000														
tan	-0.110	1.000													
gro	0.020	0.001	1.000												
tax	-0.003	0.030	0.005	1.000											
erv	0.280	0.002	0.077	0.015	1.000										
ndt	0.003	0.255	-0.160	0.037	0.125	1.000									
csh	0.872	-0.169	0.053	-0.003	0.249	0.157	1.000								
siz	-0.056	-0.180	0.020	-0.043	-0.140	-0.062	-0.034	1.000							
imltl	-0.168	0.011	0.005	0.025	0.015	-0.029	-0.237	0.270	1.000						
imltd	-0.269	0.313	0.008	0.048	0.010	0.075	-0.293	-0.023	0.571	1.000					
imlltd	-0.242	0.308	0.049	-0.007	-0.008	0.066	-0.250	0.060	0.395	0.692	1.000				
imlmvd	-0.387	0.200	-0.023	0.035	-0.164	0.036	-0.396	0.105	0.488	0.804	0.583	1.000			
gdp	0.117	-0.013	0.096	0.069	0.316	0.077	0.190	-0.142	-0.078	-0.009	0.065	-0.192	1.000		
inr	-0.108	0.007	-0.110	-0.062	-0.354	-0.091	-0.197	0.166	0.078	-0.020	-0.079	0.209	-0.883	1.000	
smd	0.070	0.005	0.109	0.068	0.260	0.050	0.134	-0.160	-0.076	0.009	0.096	-0.185	0.751	-0.670	1.000

Note: This table shows the correlation coefficients among between the explanatory variables. *pro* is the profitability measured as the ratio of operating income to total assets. *tan* is the tangibility measured as the ratio of net property, plant, and equipment and inventory to total assets. *gro* is the firms' growth measured as the percentage change in total assets from the last year. *tax* is the firms' effective tax rate measured as the ratio of taxes paid to total taxable income (pretax income). e*rv* is the earning volatility measured as the ratio of the standard deviation of operating income to total assets. *ndt* is the non debt tax shield measured as the ratio of annual depreciation, depletion, and amortization expense to total assets. *csh* is the cash measured as the ratio of the sum of depreciation and net income to total assets. *siz* is the firm size measured as the natural logarithm of total assets of the firm. *Imltl* is the industry median leverage using total liabilities as the measure of the leverage. *imltd* is the industry median leverage using total debt as the measure of the leverage. *imlltd* is the industry median leverage using long term debt as the measure of leverage. *imlmvd* is the industry median leverage using market value leverage as the measure of the debt. *gdp* is the annual growth in nominal GDP. *inr* is the interest rate, which is the maximum lending rate in the country using world Bank's WDI. *smd* is the stock market development measured as the Ratio of Stock Market capitalization to country's GDP.

Correlation Matrix is reported in research studies to identify the multicollinearity among the explanatory variables. Asteriou and Hall (2007) state that researchers appear to believe that correlation coefficient of more than 0.9 between variables may be problematic in estimation. Taking this as the benchmark, the table 4.3 shows that the pair wise correlations among the regressors are relatively small. Hence, multicollinearity should not be of concern in this study. Pair wise correlation coefficients among the country specific variables such as stock market development, GDP growth, and interest rate, are relatively higher but still they are lower than the benchmark of 0.9, suggested by Asteriou and Hall (2007).

Table 4.4
Variance Inflating Factor

Variable	VIF (ODtd)	VIF (ODltd)	VIF (ODmvd)	VIF (ODtl)
gdp	5.77	5.77	5.8	5.76
csh	5.36	5.39	5.41	5.58
pro	5.08	5.13	5.17	5.16
inr	4.79	4.79	4.8	4.77
smd	2.33	2.33	2.34	2.32
ndt	1.3	1.31	1.34	1.32
erv	1.28	1.31	1.29	1.29
tan	1.28	1.27	1.27	1.21
iml	1.21	1.22	1.24	1.18
siz	1.08	1.1	1.1	1.18
gro	1.05	1.05	1.07	1.05
tax	1.01	1.01	1.01	1.01
Mean VIF	2.63	2.64	2.65	2.65

Note: This table presents the variance inflating factors for all variables using different measures of leverage. *pro* is the profitability measured as the ratio of operating income to total assets. *tan* is the tangibility measured as the ratio of net property, plant, and equipment and inventory to total assets. *gro* is the firms' growth measured as the percentage change in total assets from the last year. *tax* is the firms' effective tax rate measured as the ratio of taxes paid to total taxable income (pretax income). e*rv* is the earning volatility measured as the ratio of the standard deviation of operating income to total assets. *ndt* is the non debt tax shield measured as the ratio of annual depreciation, depletion, and amortization expense to total assets. *csh* is the cash measured as the ratio of the sum of depreciation and net income to total assets. *siz* is the firm size measured as the natural logarithm of total assets of the firm. *Iml* is the industry median leverage. *gdp* is the annual growth in nominal GDP. *inr* is the interest rate, which is the maximum lending rate in the country using world Bank's WDI. *smd* is the stock market development measured as the Ratio of Stock Market capitalization to country's GDP.

Non existence of multicollinearity in our data is also confirmed by the variance inflating factor (VIF) calculated for this study. Increase in collinearity of the variables increases the VIF. If there is no collinearity the VIF is 1. Regarding the VIF, Gujarati (2004) states a rule of thumb, suggesting that if VIF is more than 10 than the variable is said to be highly collinear. The table 4.4 shows that overall mean of VIF for all proxies of debt is lower than 3. Hence multicollinearity is not an issue in our model. For some individual variables such as GDP, cash, profitability, and interest rate, VIF is nearly 5, but they are not troublesome as it is far less than 10. Briefly, both pair wise correlation and VIF confirm the non existence of multicollinearity in our model.

4.3 Estimation Results of Fixed Effect Regression

Table 4.5 reports the estimation results of equation (2) using fixed effect regression. Fixed effect regression is used to find the optimal debt which is required to calculate distance variable. Distance variable is the absolute difference between optimal debt and observed debt and is used as determinant of adjustment speed in equation (14). Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010), Haron *et al*. (2013) and Lemma and Negash (2014) also use fixed effect regression to estimate the distance variable.

Table 4.5 reports the fixed effects estimation results using four proxies of leverage. The table shows that tangibility has consistently positive impact on corporate debt for all four proxies of debt using fixed effect regression estimation. It has significant relationship for all four measures of leverage. Positive significant relationship of tangibility with debt suggests that firms in Pakistan use tangible assets as collateral to

issue secured debt. This finding is in line with the findings of many other studies such as Rajan and Zingales (1995) for G-7 countries, Shah Amir (2007) for Pakistan, Delcoure (2007) for transition economies, De Jong *et al.* (2008) for a sample of developed and developing countries, and Haron and Ibrahim (2012) for Malaysian firms.

Table 4.5 shows that growth of the firm has negative significant relationship with debt using total debt to total assets as the measure of debt. This finding is supported by the predictions of agency theory which suggests that the growing firms use less debt because they want to avoid restrictions likely to be imposed by the lenders (Deesomsak *et al.,* 2004). De Jong *et al.* (2008) also find negative significant relationship of growth with leverage for the majority of the countries in their sample. For other three measures of the leverage, negative insignificant relationship of growth with debt is found.

Consistent findings are shown in table 4.5 regarding the impact of firm size on use of debt. This firm specific variable is found to have significant positive effect for all proxies of dependent variable. Positive effect of size on debt in Pakistan, as argued by Drobetz and Fix (2005), reflects that large firms are supposed to be diversified and hence less risky. So, such firms use more debt. Positive significant impact of size on firms' debt is also reported in the studies of Delcoure (2007), Antoniou *et al.* (2008) and Ameer (2013).

Table 4.5

Fixed Effect Estimation Results

	Long Term debt (ODltd)			Total Liabilities (ODtl)			Total debt (ODtd)			Total debt Market value (ODmvd)		
Variable	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
cons	-0.723	-3.33	0.001***	-1.752	-6.09	0***	-1.256	-5.18	0***	-1.9215	-6.86	0***
tan	0.205	6.21	0***	0.074	1.67	0.096*	0.217	5.88	0***	0.178	4.15	0***
gro	-0.003	-0.38	0.703	-0.014	-1.44	0.15	-0.015	-1.79	0.074*	-0.0133	-1.4	0.162
siz	0.052	3.78	0***	1.28E-01	7.07	0***	0.085	5.62	0***	0.127	7.19	0***
pro	-0.073	-0.97	0.33	0.221	2.22	0.027**	0.023	0.27	0.785	-0.0619	-0.65	0.518
erv	0.018	0.28	0.783	0.814	9.53	0***	0.257	3.6	0***	0.151	1.8	0.073*
ndt	0.51	2.26	0.024**	0.791	2.65	0.008***	0.564	2.25	0.025**	0.733	2.5	0.013**
csh	-0.148	-1.6	0.111	-0.695	-5.65	0***	-0.47	-4.56	0***	-0.4517	-3.74	0***
tax	0.006	0.48	0.63	0.009	0.53	0.593	-0.005	-0.32	0.752	-0.01069	-0.64	0.522
iml	0.454	6.65	0***	0.582	10.07	0***	0.394	7.37	0***	0.5638	14.47	0***
smd	0.001	1.59	0.111	-0.00004	-0.08	0.94	0.001	1.46	0.143	-0.0005	-1.09	0.275
inr	-0.013	-4.12	0***	-0.016	-3.72	0***	-0.013	-3.72	0***	-0.0085	-2.08	0.038**
gdp	-0.006	-1.89	0.06*	-0.005	-1.15	0.25	-0.004	-1.13	0.258	0.007	1.73	0.085*
R-Square		0.7693			0.8297			0.877			0.9018	
Adjsuted R-Square		0.7217			0.8			0.851			0.8815	
F-Stat		16.14***			23.74***			33.78***			44.53***	

Note: This table presents the estimation results of equation (2) using fixed effect regression to obtain estimates of optimal debt that is used to find the distance variable required for identifying factors affecting adjustment speed. *tan* is the tangibility measured as the ratio of net property, plant, and equipment and inventory to total assets. *gro* is the firms' growth measured as the percentage change in total assets from the last year. *siz* is the firm size measured as the natural logarithm of total assets of the firm. *pro* is the profitability measured as the ratio of operating income to total assets. *erv* is the earning volatility measured as the ratio of the standard deviation of operating income to total assets. *ndt* is the non debt tax shield measured as the ratio of annual depreciation, depletion, and amortization expense to total assets. *csh* is the cash measured as the ratio of the sum of depreciation and net income to total assets. *tax* is the firms' effective tax rate measured as the ratio of taxes paid to total taxable income (pretax income). *Iml* is the industry median leverage. *smd* is the stock market development measured as the ratio of Stock Market capitalization to country's GDP. *inr* is the interest rate, which is the maximum lending rate in the country using world Bank's WDI. *gdp* is the annual growth in nominal GDP. Coefficients marked ***, **, and * are significant at the 1%, 5%, and 10% level of significance respectively.

Profitability has negative insignificant relationship with long term debt and quasi market value debt[10]. For total liabilities to total assets and total debt to total assets it has positive relationship with leverage. However, significance (positive) of the relationship of profitability with debt is found for total liabilities to total assets measure of leverage. Positive significant relationship of profitability with leverage is in line with the predictions of trade-off theory, which states that the higher is the profitability, the less risky will be the firms and the higher will be the tax rates (Getzmann *et al.,* 2010). Hence; less risky firms with high tax rate use more debt. Hovakimian *et al.* (2004) find the positive relationship of profitability with leverage which is in line with predictions of trade off theory.

The impact of earning volatility on leverage is consistently positive significant for all measures of leverage except long term debt to total assets; where it is insignificant. Positive significant relationship of earning volatility in Pakistan may be attributed to the argument of Frank and Goyal (2009) that pecking order predicts the positive relationship between earning volatility and debt because adverse selection cost may largely affect the firms with volatile earnings, hence such firms use more debt. Similar results are reported by Antoniou *et al.* (2008) and Haron *et al.* (2013).

As shown in table 4.5, fixed effect estimation finds positive significant relationship of non-debt tax shield with leverage for all proxies. Bradley *et al.* (1984) provide possible explanation for this relationship. They argue that non-debt tax shield may reflect collateral value of firms' assets; hence firms with high non-debt tax shield

[10] As depicted in table 4.3 there is high correlation between cash and profitability. To avoid the multicollinearity and its impact on estimation a robustness check is done by dropping profitability and than cash one by one and re-estimating the model. The results are found same as reported in table.

(collateralizable assets) may use more debt. Similar findings are also reported by Bradley *et al.* (1984), and Delcoure (2007). Chakraborty (2010), using fully modified ordinary least square (FMOLS), also report positive significant relationship of non-debt tax shield with optimal debt in India.

Cash is reported to have consistently negative impact on debt. It has significant impact for all measures of leverage except long term debt to total assets. This finding is in line with the argument of pecking order theory. The results suggest that firms in Pakistan, finance their assets internally with cash and do not go for external financing and use less debt. Similar findings are also reported by Bahaduri (2002) for India and Viviani (2008) for France.

Table 4.5 further reveals that the effective tax rate has consistently insignificant impact on leverage for all proxies. Positive insignificant impact is found for long term debt to total assets and total liabilities to total assets measure of leverage. Insignificant positive effect of tax is also reported by Antoniou *et al.* (2008) for all countries in their sample except for Japan. For total debt to total assets and market value measure of leverage negative insignificant impact of effective tax rate on debt is found.

As evidenced in table 4.5, firms in Pakistan follow the industry practices in making financing decisions. Industry median leverage[11] is found to have consistently positive significant relationship with the debt for the firms in same industry. Similar findings

[11] As depicted in table 4.1, there are 16 industries in which there is only one firm. To avoid any estimation problem the distance variable is used to have the robustness check. The results are found to be robust.

regarding the impact of industry median leverage on firms' debt are also reported by Flannery and Rangan (2006), Mukherjee and Mahakud (2010), and Oztekin and Flannery (2012).

As shown in table 4.5, stock market development does not affect leverage in Pakistan[12]. The relationship of stock market development with debt is found to be insignificantly negatively related with leverage for total liabilities to total assets and quasi market value leverage ratios. For the other two measures of leverage it has insignificant positive relationship with debt. Similar findings regarding the relationship of stock market development are reported by De Jong *et al.* (2008) for various countries and Haron and Ibrahim (2012) for Malaysia.

Interest rate is consistently having negative significant relationship with leverage across all proxies of debt. Negative significant relationship of interest with debt suggests that the Pakistani firms prefer to finance their assets with debt when interest rate in the economy is low. This finding is similar to the findings of Antoniou *et al.* (2008) and Nor *et al.* (2011).

GDP has positive significant impact on the use of debt for quasi market measure of leverage. Positive effect of GDP on firms' debt supports the argument that in good economic conditions, the probability of bankruptcy decreases; hence firms make more use of debt (De Jong *et al*., 2008). Similar findings are reported by De Jong *et al.*

[12] As depicted in table 4.3 there is high correlation among stock market development, gdp, and interest rate. To avoid the multicollinearity and its impact on estimation a robustness check is done by dropping each of these variables one by one and re-estimating the model. The results are found same as reported in table.

(2008) and Nor *et al.* (2011). It has significant negative impact on debt when long term debt to total assets is used as the proxy of leverage. For other two measures, total liabilities to total assets and total debt to total assets, GDP is found to have negative insignificant impact on leverage in Pakistan using fixed effect estimation.

4.4 Estimation Results of Speed of Adjustment

Table 4.6 reports the estimation results of equation (9) using Arellano and Bond (1991) difference GMM estimation technique for different proxies of leverage. Equation (9) has been estimated using second lag of all explanatory variables as instruments. The longer lags of the variables can also be used as the instruments but this would reduce the sample size further (Baum, Caglayan, & Rashid, 2013). Consistency of the GMM estimator depends on the validity of instruments (Roodman, 2009). Table 4.6 reports the Hansen J statistics that is used to assess the validity of instruments. The null hypothesis of this test is that the instruments are exogenous.

Table 4.6 shows that the p-values of Hansen test for all measures of leverage are greater than 0.05 suggesting that the null hypothesis cannot be rejected and the instruments are valid. Table 4.6 also reports Arellano-Bond test for first order autocorrelation (AR1) and second order autocorrelation (AR2) tests. AR(1) and AR(2) examine the null hypothesis that the error terms of differenced equation are not serially correlated at first order and second order. Since differenced form of the equation is used, so by construction error term is probably serially correlated at level 1. However, AR(2) is important as it detects autocorrelation in levels. The p-values of AR(2) reported in table 4.6 suggests that error terms are not serially correlated at

levels so the null hypothesis cannot be rejected. Table 4.6 also reports the results of third diagnostic test named F-test. The null hypothesis of this test in the model is that all the coefficients of the determinants of target leverage are jointly equal to zero. Table shows that the p-value of F- statistics for all measures of leverage are less than 0.05; hence rejecting the null hypothesis.

First row of the table 4.6 shows the value of the coefficient of the lagged dependent variables using different measures of the leverage. The lower the coefficients of the lagged dependent variables, the higher will be the speed. The coefficient of lagged dependent variable, using long term debt as the dependent variable, is reported to be 0.449, which is significant at 5%. The significance of the lagged dependent variable confirms the existence of target capital structure among Pakistani firms and they make partial movement to that target. This partial movement towards target is due to the existence of transaction cost (Ozkan, 2001). Given that the adjustment coefficient, λ_0, is equal to 1- $\delta_{it,}$ the adjustment speed turns out to be 0.551 or 55.1 percent[13]. This implies that it takes 1.8 years, calculated as $1/\delta_{it}$, for firms in Pakistan to be on target or optimal debt level.

The coefficient of the lagged dependent variable, using total liabilities to total assets as proxy of leverage, is 0.508 which is also significant at 1% level. The adjustment speed turns out to be 0.492 or 49.2 percent employing that it takes firms 2.03 years in Pakistan to move to the target debt ratio. Considering total debt, measured as the sum of long term debt and short term debt to total assets, as proxy of the leverage, the

[13] Adjustment speed is calculated as $\lambda_0 = (1- \delta_{it})$.

adjustment speed towards target is 0.682 or 68.2 percent. In terms of time, it takes 1.46 years[14] to make full adjustment towards optimal debt. Similarly using quasi market value leverage, calculated as total debt divided by the sum of book value of debt and market value of equity as proxy, the adjustment speed is 0.579. In terms of years it takes 1.73 years to make full adjustment towards target. The adjustment speed towards optimal debt in Pakistan ranges from 49 percent to 68 percent using four different measures of debt. Total time to be taken to make full adjustment towards target, is in the range of 1.46 years to 2.03 years.

The range of adjustment speed confirms that the adjustment speed is a function of how we measure the leverage (Lemma & Negash, 2014). Lemma and Negash (2014) also report the high adjustment speed range for nine developing countries of Africa. They estimate adjustment speed ranging from 39.4 percent to 59 percent depending upon the measure of leverage used. Haron (2014) also concludes that the use of different estimation techniques with same measure of leverage or different measures of the leverage with same estimation technique yield different results.

The estimated adjustment speed of Pakistani firms is comparable to 57 percent of Malaysia, as estimated by Haron *et al.* (2013) and it is higher than the range of 27 percent to 39 percent reported by Getzmann *et al.* (2010) for Asian firms, 43% for Indian firms (Mukherjee & Mahakud, 2010), and 40 percent for South African firms (Matemilola *et al.,* 2013). Haron *et al.* (2013), in another study, report the adjustment speed of 64.1 percent for firms in Thailand. The estimated speed of adjustment is also

[14] calculated as $1/\delta_{it}$

Table 4.6

Adjustment Speed and Determinants of Target Debt

		Long Term debt (ODltd)			Total Liabilities (ODtl)			Total debt (ODtd)			Total debt Market value (ODmvd)	
Variable	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t- stat	p-value	Coefficient	t-stat	p-value
OD_{it-1}	0.449	2.32	0.022**	0.508	6.4	0***	0.318	2.77	0.006***	0.421	5.53	0***
tan	0.61	1.87	0.064*	0.199	1.95	0.053*	0.581	2.39	0.018**	0.333	2	0.047**
gro	0.032	0.84	0.4	0.01	0.4	0.692	0.044	1.57	0.118	0.109	2.81	0.006***
siz	-0.026	-0.92	3.60E-01	-7.00E-03	-0.31	0.757	0.018	0.58	0.563	0.027	0.72	0.474
pro	-0.048	-0.28	0.781	0.141	0.99	0.324	0.076	0.54	0.587	-0.039	-0.19	0.852
erv	-0.358	-2.25	0.026**	-0.15	-1.11	0.27	-0.271	-1.85	0.067*	-0.061	-0.31	0.758
ndt	-2.767	-2.55	0.012**	0.618	0.78	0.437	-0.556	-0.61	0.544	0.267	0.26	0.797
csh	-0.172	-0.65	0.518	-0.55	-3.11	0.002***	-0.427	-2.32	0.022**	-0.05	-0.19	0.853
tax	-0.009	-0.24	0.81	0.032	0.92	0.359	0.033	0.78	0.438	-0.016	-0.29	0.773
iml	0.502	2.79	0.006***	0.405	3.65	0***	0.448	3.57	0.001***	0.547	4.52	0***
smd	0.001	0.48	0.634	-0.001	-1.16	0.248	0.001	1.14	0.256	-0.001	-0.91	0.367
inr	-0.005	-0.99	0.323	-0.006	-1.87	0.064*	-9.00E-03	-1.93	0.056*	0.004	0.78	0.436
gdp	-0.002	-0.48	0.632	-0.001	-0.14	0.887	-0.003	-0.89	0.378	0.004	1.13	0.262
AR(1)			2.58***			4.3***			-4.51***			-5.13***
AR(2)			0.21			1.69			1.33			1.2
Hansen J-Stat			70.44			72.23			64.38			61.81
F-Stat			17.87***			10.38***			9.17***			15.79***
No: instruments			80			80			80			80

Note: This table presents the estimation results of equation (9) to obtain estimates of adjustment speed and the factors affecting the target debt. OD_{it-1} is the lagged leverage. *tan* is the tangibility measured as the ratio of net property, plant, and equipment and inventory to total assets. *gro* is the firms' growth measured as the percentage change in total assets from the last year. *siz* is the firm size measured as the natural logarithm of total assets of the firm. *pro* is the profitability measured as the ratio of operating income to total assets. *erv* is the earning volatility measured as the ratio of the standard deviation of operating income to total assets. *ndt* is the non debt tax shield measured as the ratio of annual depreciation, depletion, and amortization expense to total assets. *csh* is the cash measured as the ratio of the sum of depreciation and net income to total assets. *tax* is the firms' effective tax rate measured as the ratio of taxes paid to total taxable income (pretax income). *Iml* is the industry median leverage. *smd* is the stock market development measured as the ratio of Stock Market capitalization to country's GDP. *inr* is the interest rate, which is the maximum lending rate in the country using world Bank's WDI. *gdp* is the annual growth in nominal GDP. Coefficients marked ***, **, and * are significant at the 1%, 5%, and 10% level of significance respectively.

higher than 33 percent estimated by Flannery and Rangan (2006) for firms included in Compustat database and 34 percent for USA. Ozkan (2001) reports the adjustment speed of 43 percent for UK firms. Elsas and Florysiak (2011) estimate the adjustment speed of 26 percent for all Compustat firms. Adjustment speed of Pakistani firms, found in this study, is also higher than the 20 percent speed estimated for group of developed countries (G-7 countries) by Drobetz and Wanzenried (2013).

A high adjustment speed towards target is considered as a support for the trade-off theories, while a low speed of adjustment denies the existence of target capital structure (Xu, 2007). The high speed of adjustment suggests that Pakistani firms frequently undergo the adjustment process. This quick and frequent adjustment may possibly be attributed to lower adjustment cost and time. Issuance and retiring debt in corporate bond market incurs high cost and takes more time. Since the Pakistan's corporate bond market is underdeveloped (Saleem, 2013), the corporations may find it relatively easy to access banks for borrowing (if underleveraged) or retiring debt (if overleveraged). It incurs less cost and time to borrow and retire debt with banks than the bond market.

4.5 Estimation Results- Determinants of Target Leverage

This section presents and discusses the findings regarding the impact of various firm, industry, and country specific variables on the target debt. Following is the variable wise discussion of the results.

4.5.1 Relationship between Asset Tangibility and Optimal Leverage

Table 4.6 shows that asset tangibility has consistently positive significant relationship with optimal debt for all measures of leverage. The significance of asset tangibility in determining the optimal leverage is established at 5 percent and 10 percent. Positive significant relationship of tangibility with all measures of leverage is justified by the fact that firms use tangible assets as collateral to issue secured debt (De Jong *et al.*, 2008). Positive significant relationship of tangibility with optimal leverage is in line with the findings of Cho *et al.* (2014) for a sample of 48 countries, Haron *et al.* (2013) for Malaysia, Antoniou *et al.* (2008) for developed countries (USA, UK, France, Germany, Japan), and Drobetz and Wanzenried (2006) for Switzerland.

4.5.2 Relationship between Firm Growth and Optimal Leverage

Regarding the relationship of firm's growth with leverage, table 4.6 shows that it has consistently positive relationship with all measures of leverage. The significance of the relationship at 1 percent is established only for quasi market value measure of debt. This positive significant relationship of growth with debt in Pakistan, suggests that growing firms use high debt. The positive significant relationship of growth with leverage is supported by the predictions of pecking order theory. According to pecking order theory, the high growth firms need more debt capital to meet their capital expenditure requirements, if the information and transaction costs are higher for equity than debt (Bhaduri, 2002). The positive relationship of growth with leverage in this study for Pakistan is similar to the findings of the studies such as Haron (2014) for Malaysia, Ayber-Aria *et al.* (2012) for Spain, Ameer (2013) for Asian countries, and De Haas and Peeters (2006) for Latvia and Lithuania.

4.5.3 Relationship between Size and Optimal Leverage

Table 4.6 shows that firm size appears to affect negatively to leverage in Pakistan when long term debt to total assets and total liabilities to total assets are used as the measures of the leverage. Size has positive impact on leverage when total debt to total assets and quasi market value debt are used as the proxies of debt. However the relationship is insignificant for all four measures of leverage. Negative relationship of size with leverage in Pakistan is compatible with the findings of Rajan and Zingales (1995) for Germany, Delcoure (2007) for all sampled countries except Russia using long term debt as the measure of leverage, De Jong *et al.* (2008) for 14 countries in their sample, Chakraborty (2010) for India, and Ting and Lean (2011) for government linked companies in Malaysia.

The positive insignificant relationship of firm size with leverage in Pakistan is in line with the findings of Drobetz and Fix (2005) for Swiss firms, Flannery and Rangan (2006) for Compustat firms, and Lemma and Negash (2014) for African countries.

4.5.4 Relationship of Profitability with Optimal Leverage

Table 4.6 shows that profitability has insignificant impact in determining the firms' leverage in Pakistan. It has negative relationship with optimal debt when leverage is measured as long term debt to total assets and quasi market value measure of debt. Relationship of profitability is positive with debt when it is measured as total liabilities to total assets and total debt to total assets measures of the leverage. Several studies, such as Lemma and Negash (2014) for African economies, Haron *et al.* (2013) for Malaysia, Mukherjee and Mahakud (2010) for India, Sbeiti (2010) for 3

Gulf countries, Byoun (2008) for US, and Kim *et al.* (2006) for Korean firms find negative relationship of profitability with leverage. However Hovakimian (2004) report the positive significant relationship of profitability with leverage for a subsample in their study. De Jong *et al.* (2008), in country wise estimates, report profitability having positive insignificant relationship with leverage for Germany, Philippines, and Poland.

4.5.5 Relationship between Earning Volatility and Optimal Leverage

Table 4.6 shows that earning volatility of the firm has consistently negative relationship with leverage across all measures of the leverage. Table shows that the significant relationship of earning volatility with leverage is established at 5 percent for long term debt to total assets and at 10 percent for total debt to total assets. Negative relationship of earning variability suggests that firms in Pakistan avoid using debt when their income is not stable. As argued by Baum *et al.* (2013), negative relationship of earning volatility with target leverage implies that there is a positive bankruptcy cost in Pakistan and an increase in business risk leads to an increase in the probability of default, hence; firms use less debt in times of increased risk. This negative relationship between earning volatility and debt is supported by the predictions of trade-off theory because the higher the variability in earnings the higher will be the chances of being bankrupt (Drobetz & Fix, 2005). Lemma and Negash (2014) for African countries and Ayber-Arias *et al.* (2012) for Spanish SMEs, report negative significant relationship of earning variability with long term leverage. De Jong *et al.* (2008) also find negative significant impact of earning volatility on leverage for 14 countries in their sample.

4.5.6 Relationship between Non-debt Tax Shield and Optimal Leverage

Table 4.6 shows that non-debt tax shield is negatively significant in determining the leverage in Pakistan using total debt to total assets as the measure of the leverage. Negative insignificant relationship of non debt tax shield with leverage is also observed for total debt. However for other two measures of leverage, positive insignificant relationship is found. Negative relationship of non-debt tax shield with debt is in line with the argument that firms in Pakistan consider the tax savings from depreciation as the substitute of the tax savings from debt. Hence firms with high amount of non debt tax shield use less debt. Negative significant relationship of non-debt tax shield with leverage is reported in studies such as Deesomsak *et al.* (2004), Flannery and Rangan (2006), and Ameer (2013). Negative insignificant relationship of non-debt tax shield is also reported by Mukherjee and Mahakud (2010) for book value leverage in India, Haron and Ibrahim (2012), and Haron *et al.* (2013) in Malaysia.

Positive insignificant relationship of non-debt tax shield with optimal leverage is also reported by Delcoure (2007) for European countries, Antoniou *et al.* (2008) for developed countries, and Matemilola *et al.* (2013) report South African firms.

4.5.7 Relationship between Cash and Optimal Leverage

Regarding the relationship of cash with leverage, it is evident in table 4.6 that cash is having consistently negative relationship with leverage for all four measures of leverage. However significance of the negative relationship is established for total liabilities to total assets and total debt to total assets measures of leverage. This

negative significant relationship of cash with leverage in Pakistan may be attributed to pecking order theory's prediction that availability of high amount of cash reduces the need for external financing, hence also debt (Ameer, 2013). Negative significant relationship of cash with leverage is reported by the studies such as De Miguel and Pindado (2001) for Spain, Viviani (2008) for France, and Ameer (2013) for 12 emerging economies.

4.5.8 Relationship between Firm Tax Rate and Optimal Leverage

Table 4.6 shows that firms' effective tax rate in Pakistan is insignificant in determining the leverage across all proxies of leverage. It has negative insignificant relationship with long term debt to total assets and quasi market value debt, and positive insignificant relationship with other two measures of leverage. Our results of the negative relationship of effective tax rate with leverage in Pakistan match the results of Antoniou *et al.* (2008), De Jong *et al.* (2008), and Fan *et al.* (2012).

Since tax rate turns out to be insignificant for all measures of debt, Frank and Goyal (2009) state two reasons for that. First reason may be the inability of effective tax rates to fully capture the complexity of the tax structures in the country. Second reason may be that effective tax rate may have positive effect on the debt only for firms using suboptimal amount of debt.

4.5.9 Relationship between Industry Median Leverage and Optimal Leverage

Consistently positive significant relationship of industry median leverage with firms' leverage for all proxies of debt is depicted in table 4.6. Industry median leverage

considers the impact of other industry specific factors that are omitted in model and might have impact on borrowing decisions of the firms in the same industry (Mukherjee & Mahakud, 2010). The positive significant relationship of industry median leverage with firms' leverage suggests that Pakistani firms follow the industry practices in making the borrowing decisions. Higher the industry median leverage higher will be the debt used by the firms belonging to same industry. These findings of the positive significant relationship of industry median leverage with firms' leverage are compatible with many other studies such as Cho *et al.* (2014) for 48 countries, Joeveer (2013) for transition economies, Hanousek and Shamshur (2011) for Eastern European countries, Mukherjee and Mahakud (2010) for India, and Flannery and Rangan (2006) for Compustat firms.

4.5.10 Relationship of Stock Market Development with Leverage

Table 4.6 reports that the stock market development also turns out to be insignificant in determining the leverage in Pakistan. It has negative impact on debt for total liabilities to total assets and quasi market value debt, and positive insignificant impact on long term debt to total assets and total debt to total assets. Bokpin (2009) also reports the negative insignificant relationship of stock market capitalization (used as the measure of the access to equity market) with firms' leverage for three out of four measures of leverage. Haron *et al.* (2013) also find negative relationship of stock market development with leverage for Malaysian firms and they find the significance for only one measure of leverage out of four. De Jong *et al.* (2008) and Mukherjee and Mahakud (2010) also report negative relationship of stock market development with leverage. This positive insignificant relationship is considered to be the confusing result.

4.5.11 Relationship of Interest Rate with Leverage

Regarding the relationship of interest rate with leverage, results given in table 4.6 show that the interest rate is significant determinant of corporate borrowing in Pakistan when total liabilities to total assets and total debt to total assets are used as the measures of the leverage. Significance is established at 10 percent. Negative insignificant and positive insignificant relationships are found for long term debt to total assets and quasi market measure of leverage respectively. Negative relationship of interest rate with leverage confirms the findings of the surveys by Graham and Harvey (2001) and Drobetz *et al.* (2006) that firms use less debt when interest rate is high and vice versa. Negative relationship of interest rate with leverage is reported by Antoniou *et al.* (2008) for developed countries and Haron and Ibrahim (2012) for Malaysia. The finding of positive insignificant relationship of interest rate with leverage is similar to that of Deesomsak *et al.* (2004) for ASEAN, and Haron *et al.* (2013) for Malaysia.

4.5.12 Relationship of GDP with Leverage

Table 4.6 shows that GDP growth rate also is insignificant in determining the corporate debt in Pakistan across all measures of leverage. It has positive insignificant impact on firms' borrowing in Pakistan for quasi market leverage and negative insignificant for other three measures of leverage used in this study. Significant positive relationship of GDP with companies' debt is reported in De Jong *et al.* (2008) and Frank and Goyal (2009) for US. The insignificant positive relationship of GDP with debt in Pakistan is similar to that of Haron *et al.* (2013) for Malaysia, who also report insignificant positive relationship for two measures of leverage. Negative

relationship is reported by Kayo and Kimura (2011), Oztekin and Flannery (2012), and Haron and Ibrahim (2012).

Significant relationship of GDP with corporate borrowing in Pakistan is not evident for any measure of leverage. Since the GDP is the indicator of economic conditions of the country, the insignificant impact of this variable suggests that economic conditions do not affect the firms leverage decisions in Pakistan.

4.6 Determinants of Adjustment Speed

Table 4.7 reports the estimation results of equation (12) using Arellano and Bond (1991) difference GMM for different proxies of leverage.

$$OD_{it} = (1-\alpha_0)OD_{it-1} - \alpha_k X_{it} OD_{it-1} + \alpha_0 \sum_{i=1}^{n} B_k V_{kit} + \alpha_k \sum_{i=1}^{n} X_{it} B_k V_{kit} + u_{it} \qquad (12)$$

Equation (12) is estimated using second lag of all explanatory variables as instruments. In equation (12) the concern is mainly α_k parameter which is the coefficient on interaction term between explanatory variable of speed of adjustment X_{it} and lagged debt variable $ODit_{-1}$.

Table 4.7 reports the Hansen J statistics, which is used to assess the validity of instruments. The null hypothesis of this test is that the instruments are exogenous. Table 4.7 shows that the p-values for all measures of leverage are greater than 0.05, suggesting that we cannot reject null hypothesis that the instruments are valid. Table

Table 4.7

Determinants Of Adjustment Speed

	Long Term debt (ODltd)			Total Liabilities (ODtl)			Total debt (ODtd)			Total debt Market value (ODmvd)		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
OD_{it-1}	1.843	1.73	0.087*	0.955	2.4	0.018**	1.898	1.95	0.053*	1.353	1.21	0.229
ds OD_{it-1}	1.735	3.1	0.002***	0.037	0.13	0.894	1.916	5.9	0***	-0.387	-0.56	0.579
siz OD_{it-1}	-0.08	-1.19	0.237	-0.031	-1.07	0.285	-0.104	-1.67	0.097*	-0.076	-1.01	0.314
gro OD_{it-1}	0.027	0.29	0.771	-0.055	-1.21	0.228	-0.061	-0.89	0.374	0.132	1.13	0.26
pro OD_{it-1}	-1.064	-1.99	0.049**	-0.428	-2.27	0.025**	-0.693	-2.37	0.019**	-1.628	-4.01	0***
tax OD_{it-1}	0.309	1.43	0.155	0.106	1.79	0.076*	0.144	1.53	0.128	-0.208	-1.92	0.057*
gdp OD_{it-1}	-0.001	-0.07	0.945	0.001	0.06	0.951	0.001	0.07	0.943	0.023	1.82	0.071*
smd OD_{it-1}	-0.001	-0.12	0.902	-0.001	-2.43	0.017**	-0.002	-2.23	0.028**	-0.007	-4.94	0***
inr OD_{it-1}	-0.018	-0.64	0.523	-0.006	0.06	0.951	-0.004	-0.35	0.726	0.05	2.78	0.006***
AR(1)		-2.28**			-1.88**			-2.13**			-4**	
AR(2)		-2.16			0.21			-0.37			-0.32	
Hansen		41.64			36.91			41.08			41.31	
F-Stat		52.62***			5.03***			19.65***			8.58***	
Number of Instruments	50				50			50			50	

Note: This table presents the estimation results of equation (12) using difference GMM to investigate the determinants of adjustment speed. OD_{it-1} is the lagged leverage. $dsOD_{it-1}$ is the interaction term between distance of observed debt and target debt with lagged leverage. $sizOD_{it-1}$ is the interaction term between firm size and lagged leverage. $groOD_{it-1}$ is the interaction term between firms' growth and lagged leverage. $proOD_{it-1}$ is the interaction term between profitability and lagged leverage. $taxOD_{it-1}$ is the interaction term between effective tax rate and lagged leverage. gdpODit-1 is the interaction term between gdp and the lagged leverage. smdODit-1 is the interaction term between stock market development and the lagged leverage. $inrOD_{it-1}$is the interaction term between interest rate and the lagged leverage. The coefficients of these interaction terms between variables and lagged leverage are used to investigate the effect of these variables on adjustment speed. Coefficients marked ***, **, and * are significant at the 1%, 5%, and 10% level of significance respectively

4.7 also reports Arellano-Bond test for first order autocorrelation (AR1) and second order autocorrelation (AR2) tests. AR(1) and AR(2) examine the null hypothesis that the error terms of differenced equation are not serially correlated at first order and second order. Since we are using differenced form, so by construction error term is probably serially correlated at level 1. However, AR(2) is important as it detects autocorrelation in levels. The p-values of AR(2) reported in table 4.7 suggests that we cannot reject null hypothesis that error terms are not serially correlated at levels. Table 4.7 also reports the results of third diagnostic test named F-test. The null hypothesis of this test is that the all coefficients of the determinants of adjustment speed are jointly equal to zero. Table shows that the p-value of F-statistics for all measures of leverage are less than 0.05; hence rejecting the null hypothesis.

The interaction term between explanatory variable of speed of adjustment X_{it} and lagged debt variable $ODit_{-1}$ has negative sign in equation (12). Hence a negative sign of the co-efficient of any explanatory variable in table 4.7 implies the positive relationship of that variable with adjustment speed and vice versa. The discussion of the determinants of adjustment speed follows.

4.6.1 Relationship of Distance between Observed and Optimal Debt And Adjustment Speed

Table 4.7 shows that the relationship of distance variable with adjustment speed is negative and significant for long term debt to total assets and total debt to total assets measure of debt in Pakistan. It is insignificant negative and insignificant positive with

total liabilities to total assets and quasi market value measure of debt respectively. Negative relationship of distance from target and adjustment speed towards target is supported by the argument of Banerjee *et al.* (2004) and Haron *et al.* (2013) that the firms at small distance from target may choose to make quick adjustment internally without incurring transaction costs that is by changing dividend. Positive relationship of distance with adjustment speed is supported by the argument that if the firms, employing suboptimal amount of debt, are at a small distance from the target, such firms will not make frequent changes because of the large fixed cost of changing capital structure. Fixed cost of changing capital structure includes legal fees and investment banking fees (Drobetz &Wanzenried, 2006).

Lemma and Negash (2014) report similar results regarding the impact of distance on adjustment speed. They find insignificant positive, significant positive and significant negative impact of distance on adjustment speed using different proxies of debt. Similarly other studies such as Banerjee *et al.* (2004) for UK firms, Ayber-Arias *et al.* (2012) for Spanish SMEs, and Haron *et al.* (2013) for Malaysian firms report significant negative effect of distance on leverage while Haas and Peeters (2006) for Central and Eastern European economies and Mukherjee and Mahakud (2010) for India report significant positive effect of distance on adjustment speed.

4.6.2 Relationship between Firm Size and Adjustment Speed

Table 4.7 depicts that firm size has consistently positive relationship with adjustment speed towards optimal debt. The significance of the positive relationship of size with

adjustment speed at 10 percent is reported for total debt to total assets measure. Positive relationship of size with adjustment speed in Pakistan is justified by two arguments. First, the cost of changing capital structures is largely fixed and is relatively small for large firms so such firms may make quick adjustments towards their target leverage ratios (Mukherjee & Mahakud, 2010). Second, large firms have superior analysts' coverage in market and information of such firms is readily available to the investors and consequently they have better access to capital market (Drobetz & Wanzenried, 2006). Similar findings regarding the impact of size on adjustment speed is reported in studies such as Banerjee *et al* (2004) for US and UK, Drobetz *et al.* (2007) for Germany France, Italy, and UK, Mukherjee and Mahakud (2010) for India, Ayber-Arias *et al.* (2012) for Spain, and Haron *et al.* (2013) for Malaysia.

4.6.3 Relationship between Growth and Adjustment Speed

The impact of firm's growth on adjustment speed, as shown in table 4.7, is consistently insignificant for all measures of debt. It is negative insignificant for long term debt to total assets and quasi market value measure, and positive insignificant for total liabilities to total assets and total debt to total assets measure of leverage. Similar results regarding the relationship of growth with adjustment speed are reported by Haron *et al.* (2013) for Malaysian firms and Lemma and Negash (2014) also report negative significant relationship of growth with total leverage for sample of African countries.

4.6.4 Relationship between Profitability and Adjustment Speed

Table 4.7 shows that profitability has consistently positive significant relationship with adjustment speed towards optimal debt. This positive relationship of profitability with adjustment speed in Pakistan is justified by the argument of Myers and Majluf (1984) that the higher the profitability the higher are the internal funds available hence easier for the firms to make adjustment towards target capital structure. Firms with high profits have easy access to external funds (Lemma & Negash, 2014); hence these firms can easily make adjustment towards target capital structure. Hence, in Pakistan, firms with higher profitability can make required adjustment quickly either by internally available funds or by using external financing. Similar results of the positive relationship of profitability with adjustment speed are also reported in other studies such as Lemma and Negash (2014) for 9 African economies, Haron *et al.* (2013) for Malaysia, and Flannery and Rangan (2006) for Compustat firms.

4.6.5 Relationship of Effective Tax Rate and Adjustment Speed

Table 4.7 shows that the impact of firm tax rate on adjustment speed is negatively significant for total liabilities to total assets and positively significant for quasi market measures of leverage. It has negative insignificant impact on long term debt to total assets and total debt to total assets measures of leverage. Positive relationship of tax with leverage is in line with the argument that the firms with high tax rate need to make quicker adjustment towards target to get the benefit of debt tax shield. Clark *et al.* (2009) for developing countries sub sample and Oztekin (2013) for sample of 37 countries report significant positive relationship of tax with adjustment speed. So far as negative impact

of tax on adjustment speed is concerned, Clark *et al.* (2009) report negative relationship of tax with adjustment speed for developed countries sub sample and Oztekin and Flannery (2012) report also negative relationship for sample of 37 countries. The negative relationship of tax with adjustment speed is confusing.

4.6.6 Relationship of GDP with Adjustment Speed

Table 4.7 shows that the relationship of GDP with adjustment speed in Pakistan is positive for long term debt to total assets and negative impact for all other measures of leverage. However significance of the relationship is only found for quasi market value measure, where it has positive significant impact. Positive relationship of GDP with adjustment speed in Pakistan is justified by the argument that in growing economy investment takes place due to increased demand, which necessitates the demand for external financing (Chipeta & Mbululu, 2013). Hence firms can make required adjustment towards target debt. On the basis of same argument, Haas and Peeters (2006) also state that firms can more easily move towards target in good economic conditions than in economic downturns. Positive relationship of GDP growth with adjustment speed is similar to the findings of Haas and Peeters (2006) for central and eastern European economies, Clark *et al.* (2009) for developed countries subsample, Oztekin and Flannery (2012) for group of 37 countries, and Chipeta and Mbululu (2013) for South Africa. Negative relationship of GDP with adjustment speed for other two measures of leverage is confusing and hard to interpret.

4.6.7 Relationship of Stock Market Development and Adjustment Speed

With regard to the impact of stock market development on adjustment speed, table 4.7 depicts that stock market development in Pakistan has consistently positive significant relationship with adjustment speed for all four proxies of debt except long term debt to total assets where it has positive insignificant impact. Positive impact of stock market development on adjustment speed is supported by Demirguc-Kunt and Maksimovic (1996) who indicate that when there is development of one financial sector in developing countries, the overall capital supply increases. Positive significant impact of stock market on adjustment speed is also reported by Lemma and Negash (2014) using long term debt as the proxy of leverage. Furthermore, financial sector development leads to change in composition of capital in developed countries; hence it becomes easier to make adjustment towards target debt. Clark *et al*. (2009) also reveal that the stock market development is an important factor affecting the adjustment speed towards optimal capital structure and has significant positive impact.

4.6.8 Relationship of Interest Rate and Adjustment Speed

Table 4.7 shows that in Pakistan lending rate in the country has negative significant relationship with firms' adjustment speed towards target leverage using quasi market measure of leverage. For other three measures of leverage the relationship turns out to be positive insignificant in determining the adjustment speed towards target debt Significant negative relationship of interest rate with adjustment speed is established for quasi market value leverage proxy of debt. Negative relationship of interest rate with adjustment speed is supported by the argument that low interest rate in the country stimulate the borrowing

by the firms to diverge to optimal debt (Drobetz, Pensa, & Whole, 2006). High prevailing interest rate in the economy hinders the adjustment process. The negative relationship of interest rate with adjustment in Pakistan is similar to the findings of Haas and Peeters (2006) for Central and Eastern European economies and Drobetz *et al*. (2007) for Germany, France, Italy, and UK.

4.7 Chapter Summary

This chapter presents the findings of the study related to the magnitude of adjustment speed towards optimal debt, factors affecting the target debt, and factors determining the speed of adjustment towards target debt. First section discusses the sample of the study and provides industry wise break-up of the sample. This section is followed by the second section that reports and discusses the descriptive statistics and multicollinearity tests. Section 3 discusses the estimations results of fixed effect regression that has been used to estimate distance variable which is required as the determinant of adjustment speed.

Section four presents and discusses the findings of Arellano and Bond (1991) first difference GMM used to estimate the adjustment speed and determinants of target debt (optimal debt). In Pakistan, the adjustment speed towards optimal debt ranges from 49 percent to 68 percent depending upon the measures of debt used. Total time to be taken to make full adjustment towards target, is in the range of 1.46 years to 2.03 years. The estimated adjustment speed towards optimal debt is found to be comparable with other

developing countries such as Malaysia, India, Thailand and some African countries. Like other developing countries' adjustment speed, the adjustment speed of Pakistani firms is also higher than the developed countries such as US and UK.

Section 5, using different measures of debt, discusses the results regarding firm specific determinants of optimal debt estimated with Arellano and Bond (1991) difference GMM estimation. The factors affecting debt are found to be based on the proxy of debt used. However, firms' tangibility, earning volatility, cash, and industry median leverage appear, almost, consistently and significantly affecting the leverage. Profitability, size, tax, stock market development, and GDP are found insignificant in determining the leverage across all proxies of leverage. Non-debt tax shield has negative significant impact on long term debt while growth has positive significant impact on quasi market value measure of leverage. Interest rate is the only country specific variable that has negative significant impact on leverage using two proxies of leverage.

Section 6, the last section of this chapter, presents and discusses the determinants of adjustment speed using different proxies of debt. Distance between optimal and observed debt, profitability, tax and stock market development have significant impact on adjustment speed towards target leverage. Distance has negative significant impact on adjustment speed. Profitability has positive significant impact on adjustment speed across all measures of leverage. Interest rate has negative significant impact on adjustment speed when quasi market value measure of leverage is used. Using same proxy of the debt, GDP is found to have negative significant impact on adjustment speed.

The following chapter, the chapter number 5, concludes this study by presenting the overview of the study, summary of findings, implication of the findings, contribution of the study, limitations of the study and proposed future research.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter summarizes the study by reiterating the objectives and motivation for the study in section 5.1. Section 5.2 briefly presents the summary of the findings. Then, section 5.3 discusses the implications of the findings for various stakeholders. Limitations of this study and recommendations for future research are described in section 5.4. This section is followed by the section 5.5 that briefly describes the contribution made by this study. Section 5.6 presents the summary of this chapter.

5.1 Overview of the Study, Motivation and Contribution

Vast literature in the area of corporate financing behavior has evolved after the Modigliani and Miller (1958) theory of the irrelevancy of the capital structure decisions to firms' value. This irrelevancy theory was based on the impractical assumptions of perfect capital market such as zero taxes, no bankruptcy cost, no transaction cost, and equal access of all stakeholders to same information. A plethora of empirical studies have been conducted and various theories such as pecking order theory, trade-off theory, and market timing theory, have emerged by relaxing these perfect market assumptions to investigate the factors determining optimal capital structure (Denis, 2012). The predictions of these theories regarding the determinants of capital structure are not mutually exclusive and firms financing behavior can be explained by more than one theory (Deesomsak, 2006; Haron, 2014).

Initially the applicability of these theories was investigated using static framework that considered the observed debt as optimal debt. Jalilvand and Harris (1984) and Fischer *et al.* (1989) pointed out to the dynamism of capital structure and concluded that due to market imperfections and adjustment costs, firms are not always at the target debt rather they strive to move towards target with certain adjustment speed. A new strand of dynamism of capital structure was started to be investigated with the objectives of estimating adjustment speed, identifying the factors affecting adjustment speed, and factors determining optimal debt.

Majority of the empirical studies contributing to the literature of financing behavior of the firms are based on the empirical findings from the developed countries such as US, UK, France, Germany, Switzerland, Canada and others. Small number of studies is there that provide empirical evidences from developing countries, particularly South Asian developing countries such as Pakistan, India, and Bangladesh and they are inconsistent in their findings. In context of Pakistan few studies (Shah, 2007; Hassan & Butt, 2009; Mahmud *et al.* 2009: Sheikh & Wang; 2012; Khan *et al.,* 2012), using static framework, are available. Existing studies use limited number of firm specific variables to understand only the determinants of corporate debt (capital structure) and still enough gap is there that need to be filled to understand the dynamism of financing behavior of Pakistani firms.

Problems of bankruptcies and delisting of the firms from Karachi Stock Exchange Pakistan, increased non performing loans of banking sector in Pakistan, limited number

of studies in area of firms' capital structure in Pakistan using limited set of variables, and non existence of the literature on the dynamism aspect of capital structure stimulated to undertake this study. This study partly fills the gap in this area; and is aimed at estimating the adjustment speed towards target debt, analyzing the factors determining the adjustment speed, and investigating the determinants of the target debt of the non financial public limited companies listed at Karachi Stock Exchange of Pakistan.

This study uses a sample of 143 firms with 1190 firm year observation from 2003-2012 extracting the firm level data from Datastream. Study uses the unbalanced panel data. Presence of the lagged dependent variable as the independent variable in the model and endogeneity issues requires the use of instrumental variable estimation technique. Given complexities of choosing instruments, Arellano and Bond (1991) difference GMM has been used as the estimation technique which considers the lag of the independent variables as the instruments.

5.2 Summary of the Findings

The empirical findings of this study are presented and discussed in Chapter 4. Findings in chapter 4 address all important research questions given in chapter 1. First, what is the adjustment speed of Pakistani firms towards target capital structure? Second, what is the relationship between firms' optimal debt ratio and firms' profitability, tangibility, growth, tax rates, earning volatility, non-debt tax shield, cash flows, size, industry median leverage, and country specific variables of GDP growth rate, interest rates, and stock

market development in Pakistan? Third, what is the relationship between adjustment speed towards optimal capital structure and firms' growth, size, profitability, tax rates, distance between target and observed leverage, GDP, stock market performance, and interest rate in Pakistan?

Results of this study are largely consistent with the available empirical findings from other countries and are explained by the existing theories of capital structure. In answering the first question of the adjustment speed of Pakistani firms towards target debt, the study finds that the speed depends upon the proxy of debt used. The adjustment speed towards target debt is found to be in range of 49 percent to 68 percent depending upon the measures of leverage used. Translating this speed into the years to be taken to make full adjustment towards target, it takes 1.46 years to 2.03 years. Matching this study's results with the results of other studies focusing on developing countries such as Lemma and Negash (2014) for African countries, Haron *et al.* (2013) for Malaysia, and Mukherjee and Mahakud (2010) for India, the adjustment speed in Pakistan is also higher than the adjustment speed of 20 percent for developed countries (G-7), as reported by Drobetz and Wanzenried (2013).

So far as the second question of the impact of firm specific, industry, and country specific factors on target leverage is concerned, the results are again justified by several previous studies and the theories of the capital structure. The factors affecting target debt are found to be based on the measure used. However, tangibility, earning volatility, cash, and industry median leverage appear, almost, consistently and significantly affecting the

leverage. Tangibility has consistently positive significant impact on leverage across all measures of leverage. Growth is insignificant in determining the corporate leverage across all measures except quasi market measure of leverage; where it has positive significant impact. Firms' profitability, size, and tax are found insignificant across all proxies of leverage. Furthermore earning volatility and cash have negative significant impact on two measures of leverage. Non-debt tax shield has negative significant impact on leverage when long term debt to total assets is used as the measure of the leverage. Findings regarding the impact of firm specific factor on target debt, as discussed in chapter 4, suggest that firms' financing behavior in Pakistan also cannot be explained by any particular single theory rather a combination of theories explain the financing decisions in Pakistan, as stated by Deesomsak *et al.* (2007).

Findings regarding the impact of industry median leverage on firms' leverage reveal that firms in Pakistan follow the industry benchmarks, as their respective leverages are significantly determined by the industries they belong to. The higher the industry median leverage the higher is the firms' leverage. This finding is also consistent with the empirical studies such as Hanousek and Shamshur (2011), Joeveer (2013), and Cho *et al.* (2014). Findings regarding the impact of country specific variables in determining the optimal debt reveal that stock market development and GDP growth rate in Pakistan have no impact on corporate leverage. However the prevailing interest rate in the economy has significant effect on the corporate borrowing decisions for two measures of leverage. These findings match the results of some other studies such as De Jong *et al.* (2008), Mukherjee and Mahakud (2010), and Haron and Ibrahim (2012).

In response to the last question of investigating factors affecting the adjustment speed towards target debt, the findings of this study are mostly consistent with the previous studies' findings for developed and developing countries. Firms' profitability has positive significant relationship with adjustment speed for all four measures of leverage. Growth is found to have no effect on adjustment speed across all measures of leverage. Distance between actual and optimal debt and firms' effective tax rate has significant impact on speed of adjustment for two measures of leverage. Stock market development has consistently positive significant impact on adjustment speed towards target leverage. GDP growth rate and prevailing interest rate in the economy have significant impact on speed of adjustment towards target debt in Pakistan. The results regarding the impact of the above factors on the adjustment speed are well justified and explained by the earlier studies of Banerjee *et al.* (2004), Flannery and Rangan (2006), Drobetz and Wanzenried (2006), Clark *et al.* (2009), Mukherjee and Mahakud (2010), Oztekin and Flannery (2012), Chipeta and Mbululu (2013), and Lemma and Negash (2014).

5.3 Implications of Findings

The empirical findings of this study have implications for various stakeholders such as corporate managers, investors, and policy makers. These implications are discussed below.

5.3.1 Implications for Corporate Managers

This research is helpful for corporate financial managers of Pakistan in understanding the important factors that are affecting the financing decisions, particularly the debt levels and adjustment speed towards target debt. Since the findings of this study are based on

the historical data, the managers can rethink on the factors they have been considering in the past in making adjustment towards target debt and using the level of debt. They can reconsider their past choices and justify that their choices have maximized the value of the firm.

The findings of this study suggest that the financial managers avoid using debt if their earnings are not stable and have high amount of cash available. Firms having high growth in assets are using more debt in Pakistan. Given this finding, financial managers may re-evaluate the decision of using debt to finance their growth, as it might lead to bankruptcy. Financial managers should follow the industry practice while making the financing decisions. They should also consider the equity market performance while making the financing decisions and prefer equity over debt if their stocks are doing well in the market.

This study further helps financial managers in understanding the factors determining the adjustment speed. Financial managers of the firms having low profits should reexamine the benefits and costs of being away from target as such firms have low speed of adjustment towards target and they may not be using full benefits of debt, or in case of overleveraged such firms are likely to be bankrupt. Findings further imply that financial managers should consider the economic environment in making financing decisions as economic conditions have impact on adjustment speed. Similarly significant impact of stock market development on adjustment speed suggests that managers can make quick

adjustment towards target by issuing or repurchasing equity if the stock market is doing well, as the cost of adjustment reduces in developed market.

5.3.2 Implications for Policymakers

The findings of this study are also helpful for the policymakers and regulatory authorities such as the Security Exchange Commission of Pakistan (SECP), stock exchanges, and the State Bank of Pakistan (SBP) to develop the policies that facilitate the organizations use optimal amount of debt and make faster adjustments towards it, to maximize their values and fully contribute in the economy. Based on the findings of this study the policymakers and regulatory authorities can develop early warning system to avoid the bankruptcies and can influence the level of debt used and adjustment speed towards target debt by bringing reforms in the capital market of Pakistan, such as developing the stock market and the bond market to facilitate the corporations in exploiting profitable investment opportunities. The negative relationship of the profitability and cash with leverage implies that firms avoid going for external finance (both debt and equity) and use internal funds. This indicates that the capital market is not developed (efficient). The policymakers need to develop capital markets so that the problem of information symmetries can be avoided and firms can easily raise required form of capital to finance their assets and make required adjustments to maximize their values. Furthermore, given the finding regarding the impact of interest rate on optimal debt and adjustment speed, policymakers such as State Bank of Pakistan can devise the monetary policy that can stimulate the firms in Pakistan to always use the optimal debt to maximize the value.

5.3.3 Implications for Investors (Shareholders and Creditors)

The investors and creditors may find the results of this research helpful by understanding the factors affecting corporate borrowing decisions and the adjustment speed towards target capital structure. Shareholders and creditors may avoid investing in the firms that are overleveraged and have lower adjustment speed towards target debt. Existing shareholders can actively participate in corporate governance and influence managers' decisions by participating in annual meetings. Since the stock market development has role in corporate financing decisions, new shareholders may be cautious in making equity investment decisions because firms may issue equity when they think that the stock is overvalued. Similarly creditors can evaluate the debt agency cost and may be willing to invest in organizational debt against the collateral or putting covenants in debt agreements to mitigate the problem.

5.3.4 Implications for Academicians and Finance Researchers

The findings of this study suggest that the area of capital structure in finance is still open for further investigation by the academicians and finance researchers. The findings of this study hold the implications for academicians and finance researchers in terms of further investigation in field of dynamic capital structure using different proxies of the same variables used in this study, using additional variables, applying different estimation techniques, using longer balanced and unbalanced panel datasets, and conducting regional investigations. Impact of behavioral aspects of management on capital structure decisions may also be investigated by academicians in future studies.

5.4 Limitations of the Study and Recommendations for Future Research

5.4.1 Limitations

Following are some of the limitations of this study.

i. This study is based on the sample of non financial listed firms of Karachi Stock Exchange of Pakistan. Number of listed firms in Pakistan is a small portion of total public, private, and small and medium enterprises (SMEs) firms. There is the possibility that financing decisions of non listed privately owned firms and SMEs in Pakistan may be affected by several other factors. They may have different speed of adjustment towards target debt and factors determining the adjustment speed may also be different for these companies.

ii. This study uses the unbalanced panel data of the non financial listed firms of Pakistan. Total number of sampled firms is 143 whose data has been taken from 2003-2012 from Datastream. Datastream contains the data of only 271 firms in Pakistan out of 456 listed firms. Excluding the financial firms and firms having the data of less than 3 years the final sample of 143 firms with 1190 firm year observations has been used. Use of panel data with more firms and firm year observations may possibly affect the findings of the study.

iii. This study uses the difference GMM as the estimation technique, which utilizes the lagged values and lagged differences of varying degrees. Since the availability of lags is affected by the panel length; so the panel dataset of different lengths can affect the performance of this estimator. Furthermore, this study does not consider the behavioral variables such as managerial confidence and attitude towards risk.

5.4.2 Recommendations for Future Studies

i. In order to get better understanding of the firms financing decisions in Pakistan, it is important to shift the focus from the empirical studies based on the secondary data to one based on the primary data (survey) to understand the corporate financial managers' behavior towards the capital structure decisions. Some survey based studies outside Pakistan have been conducted by Graham and Harvey (2001), Beattie *et al.* (2006) and Ibrahim *et al.* (2011) to properly understand the factors considered by the firms in making financing decisions. Survey based study is likely to provide better insights in this important aspect of corporate financing in Pakistan and help managers, investors, shareholders, and policy makers to make informed decisions. This proposed survey based study may be helpful for the researchers to improve the theoretical models of corporate financing decisions.

ii. As discussed in chapter 1 and 2, a limited number of firms is listed at the equity exchanges of Pakistan. Listed firms, surely, do not represent the major portion of economy in Pakistan. A large number of commercial organizations, including SMEs, is privately owned and not listed in Pakistan. Such firms have different characteristics such as the ownership structure and the agency cost. Hence, to better understand the financing behaviors of the businesses in Pakistan, it is important to consider the unlisted firms in upcoming studies of the capital structure decisions to help them to understand the dynamics of the capital structure. Similar studies, such as Hesmati (2001) for Sweden and Ayber-Arias *et al.* (2012) for Spain, are available. Separate study for privately

owned firms or inclusion of such firms in the sample with listed firms will represent a bigger portion of the economy and help in understanding the financing behavior in Pakistan.

iii. The findings of this study from Pakistan and some other studies focusing on developing countries such as Mukherjee and Mahakud (2010) for India, Haron *et al.* (2013) for Malaysia, and Lemma and Negash (2014) for African economies report higher adjustment speed towards the target debt than studies focusing on developed countries such as Flannery and Rangan (2006) and Drobetz and Wanzenried (2013). A cross-country study, including the sub-samples of both developing and developed countries, using additional country specific variables, is hereby proposed to understand these differences in the magnitude of adjustment speed.

iv. Country specific factors, in this study, mostly turn out to be insignificant in determining the optimal debt. Hence, future studies using different proxies of the same variables and adding some other variables such as rule of law, financial sector development, government borrowing, investors' (shareholders and lenders) protection, and level of corruption may be conducted to investigate thoroughly the role of country specific variables in corporate financing decisions.

v. None of the studies, as per the researcher's knowledge, is available to understand the debt maturity structure and its dynamism, of the firms in Pakistan. Some studies such as Deesomsak *et al*. (2009) for South East Asian Firms are available to investigate this dimension. Future studies in area of

corporate financing behavior of Pakistan may also focus this aspect of corporate financing.

vi. Graham and Leary (2011) suggest that borrowing also increases the risk of other firm stakeholders such as employees, collective bargaining agencies (CBAs), customers, and suppliers. There are no any studies available, either in Pakistan or other countries, as per the researcher's knowledge, to assess the impact of these stakeholders on firms' capital structure decisions. Future studies may also consider these explanatory variables by identifying their appropriate proxies.

vii. This study and many other studies such as Shyam-Sunder and Myers (1999), Shah Amir (2007), Heyman *et al.* (2007), and Sheikh and Wang (2011), confirm the existence of firm fixed effects in capital structure decisions. Future studies, based on the borrowings from management theory, may specifically consider those variables by looking into the possibility of developing index to measure those fixed effects such as managerial skills, organizational culture, and leadership style.

viii. This study has estimated the adjustment speed towards optimal debt and identified its determinants for Pakistan assuming that all firms move towards target debt at same speed and the same factors affect the speed. Faulkender *et al.* (2012) confirm that the partial adjustment model performs better in refined environment where firms' differences are taken in account rather than estimating same adjustment speed for all firms. So in light of this finding, other studies may be conducted for sub samples of the firms such as

financially constrained and unconstrained, under levered and over levered, government linked and non linked companies, and firms associated with large business groups.

5.5 Contribution of the Study

This study has made the following contributions in the area of corporate capital structure decisions in Pakistan.

i. This study, as per the researcher's knowledge, is the first attempt that has investigated the dynamism of capital structure and confirms the existence of optimal debt for Pakistani firms. The study further reports the adjustment speed towards optimal debt and also determines the factor affecting adjustment speed, which, as per the researcher's knowledge, is not done in previous studies for Pakistan.

ii. The set of variables (8 company specific, 1 industry specific, and 3 country specific variables) used to determine the optimal debt has not been tested in previous studies for the firms in Pakistan.

iii. This study is also using new country specific variables such as interest rates and stock market development for the first time to determine the optimal debt of Pakistani firms. The study finds the significant impact of stock market development on optimal debt in Pakistan for one measure of leverage.

iv. This study is using latest dataset (2003-2012) to understand the dynamics of capital structure for Pakistani firms. The database used to extract company specific data is Datastream, while earlier studies exclusively considering Pakistan,

make use of either annual reports or State Bank's "Balance Sheet Analysis of Joint Stock Companies' Report".

v. This study has made an important contribution by using four different proxies of the leverage such as total liabilities to total assets, total debt to total assets, long term debt to total assets, and quasi market leverage to analyze the significance of various variables. The results show that adjustment speed, its determinant, and determinants of target debt have some variation across different measures.

5.6 Chapter Summary

This chapter concludes this study by recapitulating the problem statement, objectives, and motivation for this study in the first section. Thereafter major findings of the study regarding the speed of adjustments, its determinants, and factors affecting target debt are presented. This summary of the findings is followed by the implications of this study for corporate financial management, shareholders and creditors, and the policymakers. This chapter further highlights the limitations of the study and presents the recommendations for future research in area of the corporate financing decisions to properly understand the financing behavior of the firms. Lastly, this chapter outlines the contribution made by this study in understanding the corporate financing decisions in Pakistan.

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